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THE IRON AGE

New York, May 31, 1923

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VOL. III, No. 22

Committee on Long Work Day Reports

American Iron and Steel Institute Accepts Conclusions, Said
Not to Be Final—President Gary Rebukes Pessimists—
Believes Prices Are Now About Right

AFTER thorough investigation and most careful consideration extending over a year, the committee on the 12-hr. day appointed at the meeting of the American Iron and Steel Institute, in May, 1922, after a conference with President Harding at the White House, made its report at the institute meeting in New York, Friday. The attendance was large, there being nearly as many present as at the Foch dinner in 1921, when 1700 were registered and 1550 attended the banquet.

Before the reading of the report of the committee, President Gary spoke of the thorough investigation which had been made by a sub-committee. He also said that experts had been employed and a large amount of information had been compiled. The report, he added, was not what the members of the committee regarded as the final word on the subject, but was presented as giving the present views of all the members of the committee.

President Gary's Address

The report was greeted by moderate applause and was adopted without discussion.

President Gary's address was unusually long, and after he had been reading an hour he became weary and found it difficult to proceed. Turning to Charles M. Schwab, who was seated in the front row, Judge Gary requested him to finish the reading of the address. The judge walked from the platform unassisted, and after a rest of about an hour was able to preside at the meeting of the directors of the institute.

Mr. Schwab read the concluding section of the address, which related to business relations. The sentiments therein expressed were heartily approved by the audience.

The striking feature of the early part of the address was its strong religious tone, and it was evident that Judge Gary was very deeply impressed by his visit to the Holy Land.

The prevailing sentiment of the nearly 1500 members and visitors who were in attendance at the meeting was one of optimism as to the general course of business for the year, but it was freely admitted that there has been a slight recession in demand and that prices of some products, especially pig iron, are showing a tendency to sag. Confidence was expressed that the comparative inactivity of the market which has been setting in will not be long continued.

E. A. S. Clarke, recently elected secretary, appeared for the first time in that capacity and sat

at the left of the president of the institute during the morning session. He announced that the prize of \$1,000 offered by Sir Robert Hadfield for the best paper on fuel conservation had been awarded to Charles L. Kinney and George R. McDermott, open-hearth superintendent and assistant chief engineer respectively of South Chicago Works, Illinois Steel Co., who presented a joint paper on "The Thermal Efficiency of the Open-Hearth Furnace" at the October, 1922, meeting of the American Iron and Steel Institute.

The Banquet

At the banquet Friday evening at the Hotel Commodore, which was attended by 1415 guests, President Gary presided. When he appeared the entire audience, recalling his slight indisposition of the morning, rose to greet him. The guest of honor was Prince Gelasio Caetani, the Italian Ambassador to the United States. Owing to the use of amplifiers, the speeches were heard distinctly in the most remote parts of the hall. Prince Caetani has spent a number of years in the United States and has the degree of mining engineer from Columbia University. During the great war, he won fame as a soldier and an engineer. His English is pure and his enunciation distinct.

In opening his address Prince Caetani made an earnest appeal for a better understanding, on the part of the people of the United States, of the history of Italy and the ideals of its people. He spoke of the attitude of Italy in regard to the war and said that his country entered the great struggle to free its brothers who had been enslaved by Austrian rule. It had the same ideals as those of the people of the United States. The Prince explained the principles of the Fascisti, contrasting them with those of the Bolsheviki. The former, he said, respected religion and the rights of men and believed in justice for all, while the latter were doing all they could to destroy religion and all social conditions. He dwelt upon the importance of capital and labor being harmonious and said that the Fascisti are doing their utmost to encourage such relations. He paid an eloquent tribute to Mussolini and spoke with gracious appreciation of the recent visit of Judge Gary and other Americans to Italy.

W. U. Follansbee, president of the Follansbee Brothers Co., Pittsburgh, made a happy speech, mostly in a humorous vein. He spoke seriously, however, of the tendency to attribute our industrial troubles entirely to immigrants and said he thought

it would be well to consider whether some of the teaching which is being done in our schools and colleges is not responsible for socialistic propaganda. He referred to the recent meeting of the representatives of the Amalgamated Association and employers, saying that the officials of the Amalgamated were reasonable and that the result of the meeting was the continuation of the old scale. He believed that at least in the steel industry the employees as a rule have not forgotten the sad experiences of 1920 and 1921, and are disposed to be fair in regard to wage problems.

In accordance with the time-honored custom of the institute, Charles M. Schwab was the last speaker. He began in a facetious vein, referring to the religious portions of Judge Gary's address. "I know of nothing," he said, "that could be so improved as the religion of the steel people. Of course I mean the rollers and the melters and others in the business. I don't need to have my religion improved. You may not know it, but out at Loretto—you know I like to tell you about things at Loretto—they know that I am noted for my piety. They do not take my religion as a joke. Eleven years ago, it was my pleasure to build a memorial church for my mother. Well, you know the good sisters teach the children the catechism, and the first question of the Roman Catholic catechism is: 'Who is the head of the Catholic Church of the world?' One day one of these good sisters put that question to a bright little youngster and he promptly replied: 'Charles M. Schwab.'"

Mr. Schwab next spoke in a humorous way about Judge Gary's visit to ancient tombs. He said the judge ran across an ancient document which looked familiar, and upon examination it was found to be a copy of the contract obligation drafted by Willis King, chairman of the committee appointed untold years ago to prepare a contract that could not be broken.

Changing to a serious vein, Mr. Schwab spoke tenderly of Judge Gary's slight illness of the morning and of the deep affection which all members of the institute have for him. He said there are plenty of spurious things, not only in Egypt, but in all parts of the world, but there are some things that are genuine, and as he looked back over the 45 years he had spent in the industry, he realized that business without sentiment is sordid, and that

trade devoted merely to the making of dollars is mean. He said that he believed that if the steel manufacturers are moderate in their price demands, prosperity will continue. He was sure that they would be moderate and that in all their business relations and in their relations to each other they would act in accordance with the highest ideals of honesty and fair dealing.

Secretary Clarke read telegrams of regret and best wishes from Joseph G. Butler, Jr., Youngstown, and Charles H. Howard, St. Louis, two highly esteemed members who were unable to be present. Mr. Butler is still unable to travel, owing to injuries received several years ago when struck by a truck.

Invited to Visit Proving Ground

The Army Ordnance Association has invited the American Iron and Steel Institute to participate in a joint meeting with it at the time of its fifth annual meeting to be held at Aberdeen Proving Ground, Maryland, next October. A tentative program of the meeting was passed around among the members of the institute, who were given an opportunity to say whether they desired to attend. The response indicated a general wish to accept the invitation.

Aberdeen is on the main line both of the Pennsylvania and the Baltimore & Ohio railroads between Baltimore and Wilmington. A special train of Pullman sleeping cars will leave the Pennsylvania Station in New York after midnight Oct. 25, will be open to passengers at 10 p. m., and will run direct to Aberdeen Proving Ground, arriving in time for breakfast. After the meeting this train will leave Aberdeen Proving Ground about 8 p. m., Oct. 26, and will arrive at the Pennsylvania Station in New York about midnight. The fare on this train for the round trip will be about \$18, and will include a sleeping berth one way and chair return. One-way tickets for this train may be purchased.

In addition, arrangements will be made for stopping both northbound and southbound express trains on both railroads at Aberdeen, and ample transportation will be provided between Aberdeen and Aberdeen Proving Ground, so that visitors so desiring may leave at convenient times during the afternoon and evening, either for the South and West or for Philadelphia and New York.

Can Not Now Adopt the Eight-Hour Day in Iron and Steel Plants

Committee Gives Labor Shortage as Principal Obstacle in Way—
Would Favor Change Under Certain Conditions

THE report of the committee on the 12-hr. day was signed by all the members, who were:

Elbert H. Gary, chairman United States Steel Corporation.
James A. Farrell, president United States Steel Corporation.

Eugene G. Grace, president Bethlehem Steel Corporation.
Willis L. King, vice-president Jones & Laughlin Steel Corporation.

Alva C. Dinkey, president Midvale Steel & Ordnance Co.
James A. Campbell, president Youngstown Sheet & Tube Co.
James A. Burden, president Burden Iron Co.
L. E. Block, president Inland Steel Co.
John A. Topping, chairman Republic Iron & Steel Co.

The report was as follows:

"Although the committee appointed by the president of the Institute to consider the 12-hr. day work in the steel industry and report conclusions and recommendations has made a very careful and painstaking study

of the facts and figures developed, it is not yet ready to make what it would designate a final report.

"Apparently the underlying reason for the agitation which resulted in the appointment of this committee was based on a sentiment (not created or indorsed by the workmen themselves) that the 12-hr. day was an unreasonable hardship upon the employees who were connected with it; that it was physically injurious to a large percentage of the employees; and that it interfered with family associations essential to the welfare of the children; that for these reasons it was, in a sense, opposed to the public interest.

"Whatever will be said against the 12-hr. day in the steel industry, investigation has convinced this committee that it has not of itself been an injury to the employees, physically, mentally or morally. Whether or not, in the large majority of cases, 12-hr. men devote less time to their families than the employees working less hours is perhaps questionable.

"A part of the manufacturing of iron and steel is necessarily continuous. Therefore, practically, there must be two shifts of 12 hr. or three shifts of 8 hr. The workmen, as a rule, prefer the longer hours because it permits larger compensation per day.

"It is asserted with confidence that there is less physical work, as a total per day, and less fatigue from the work of the 12-hr. day, in the steel industry, than pertains to the large majority of the 8-hr. men. This is because in the former case there are more rest periods during the 12 hr. on duty.

"In the opinion of the members of the committee there is no concern of importance connected with the iron and steel industry in the United States that would urge or willingly permit employees to exert themselves to a point where they would be injured physically, mentally or morally. Desire and effort to improve the conditions and promote the welfare of employees in the iron and steel industry of this country has been a cardinal principle with the employers for many years. We think this will not be contradicted by fair-minded, unprejudiced, well-informed persons.

"But in the consideration of this subject there are many questions of high importance, not involving moral or social features. They are economic; they affect the pecuniary interests of the great public, which includes, but is not confined to, employers and employees. At present the United States and all other nations are especially interested in large production, whether on the farms, in the mines or in the manufacturing. The largest reasonable production is necessary to bring about a restoration to stability, progress and prosperity; and large production at low cost, for sale at fair prices, the entire world is more dependent upon at the present time than ever before.

"Our investigation shows that, if the 12-hr. day in the iron and steel industry should be abandoned at present, it would increase the cost of production on the average about 15 per cent; and there would be needed at least 60,000 additional employees. If labor were sufficiently plentiful to permit the change, it would be necessary to add to the selling prices certainly as much

as the increase in cost due to paying many more men.

"But it would be impossible, under existing conditions, to obtain a sufficient number of men to operate the plants on a three-shift basis up to a capacity which would supply the present necessities of the purchasing public. There are not now, under a two-shift practice at the furnaces, enough men to meet the demand for iron and steel.

"To a material extent, the question of amount paid to employees, which is a very large proportion of the cost of producing, and which must necessarily determine the selling prices, is one between the employees and the purchasing public. Investors stand between these two, and it is their responsibility and their effort to decide fairly by both interests.

"The responsibility for the number of employees is partly with the American Congress, because affected by immigration. There should not be permitted too much immigration, and certainly there should be none of dangerous or injurious quality; but there ought to be enough to keep our production of foodstuffs, of metals and of other manufactures up to the necessities of the consuming public; and sufficient to meet the demands of the national welfare, which embraces the export trade.

"Therefore, under the present conditions, in view of the best interests of both employees and employers, and of the general public, the members of the committee cannot at this time report in favor of the total abolition of the 12-hr. day.

"There was a consistent, persistent and successful effort during the time labor was more plentiful to reduce the numbers of men employed 12 hr. per day. Although the percentages fluctuated, depending upon circumstances, the percentage was gradually reduced, as stated publicly. If labor should become sufficient to permit it, the members of this committee would favor entirely abolishing the 12-hr. day, provided the purchasing public would be satisfied with selling prices that justified it, and provided further that the employees would consent and that industry generally, including the farmers, would approve."

Judge Gary Says Prices Are About Right

Propaganda of Pessimists Condemned—Plan for Settling Ruhr Troubles—Recent Trip to the Mediterranean Countries

IN HIS opening address, President Gary gave a very interesting account of his recent Mediterranean trip and then referred briefly to conditions in the Ruhr valley. He expressed the belief that if the nations directly interested in the settlement of the Ruhr controversy should in due form submit every question involved to an impartial foreign nation and agree to abide by the decision, the whole matter could be dispensed with justice to all, or if the submission should be made to such a man as Secretary of State Hughes, there would be a prompt and early decision, fair, intelligent and just. "If approached, he ought to be willing to serve," said Judge Gary, "notwithstanding the heavy burdens he is carrying."

Business Conditions.

Referring to business conditions, Judge Gary paid his respects to the "small standing army of pessimists" who, he said, could not long interrupt the onward march of business prosperity. He said:

"It is not difficult to ascertain and accurately state what has happened or is occurring in the iron and steel business of this country, or to guess what may hereafter occur; but to state with certainty what will happen in the future, even for a period of six months, is impossible, though many of us in practice, from conditions as they exist, reason to a conclusion as to what is likely to happen in the near future and act accordingly.

"At present the furnaces and mills of iron and steel manufacturers are operating nearly to full capacity, limited and modified only by a lack of sufficient work-

ing forces. The producers find it difficult to satisfy the peremptory demands of consumers; this has been the situation for some months past. Stocks of finished materials in our warehouses and at the mills are very low. The unfilled orders on the books of steel manufacturers are not less than fifteen or sixteen million tons, and the new bookings and shipments of finished materials per day for the whole industry are 80,000 or 90,000 tons. In short, there is nothing in sight to indicate that there will be a substantial diminution of the demand for finished steel in this country during the next six months, to say the least.

"Of course, as always, conditions may change materially and suddenly, depending upon circumstances, but the necessities of consumers in the United States and of those in foreign countries who are our customers are so great, the population is increasing so rapidly, and the ability to buy and pay for steel, as shown by financial statements, so large, there is within view no reason to suppose there will be, certainly not in the near future, a material slackening in demand and use. The bank deposits in 25 banks only are said to be about \$8,000,000,000. Much depends upon the attitude of the business men. This includes both sellers and buyers; and it is to be remembered most of the buyers of our products are also sellers, in some form or other, of the materials which they buy.

Pessimistic Propaganda.

"There has of late apparently been a deliberate and persistent attempt to create an impression that there will be, in the near future, a substantial recession in

business activities. Business men generally understand this. The propaganda is inspired by a few short-sighted persons who do not seem to understand that if they could succeed in wrecking the business structure they would themselves be buried in the ruins.

"However, the postponements in some lines of business operations have not wholly resulted from deliberate and unworthy propaganda. In the building lines particularly, where work has not already been commenced, projected operations more or less have been postponed by reason of the extraordinary and inordinate prices charged by certain trades for wage rates, and also by the numerous strikes or threatened strikes for still higher wage rates. One need only read the reports published in the daily press to be convinced of these facts.

"As often stated publicly, 85 per cent or more of the cost of producing steel, from the raw products to the finished material, is paid to the workmen. When in order to secure sufficient workmen on buildings, contractors are compelled to pay the carpenters, painters, bricklayers, plasterers, plumbers and others in kindred lines \$10 and upward per day of eight hours, and this to workmen who are demanding a five-day week, with arbitrary limits of the work done, it is not surprising if the building of costly structures is being postponed until more favorable conditions shall obtain. The wonder is that there has been so much building during the last 18 months. If one will take the pains to go through the cities and outlying territory one will at present see thousands of buildings in process of construction.

Prices About Right.

"As a matter of course, the public will soon discover, if it is not already generally understood, that extortionate prices for materials or labor must eventually be paid by the consumer. Every unreasonable or unfair burden in business operations must eventually fall upon the user; and the law of supply and demand will sooner or later bring about exposure and remedial action which will secure fair and proper adjustments. In this connection, it is proper, though not necessary, to suggest that the steel manufacturers, in their own interest, must not permit prices for their commodities to go above a point which is fair and reasonable. We were for months selling our products at prices that were too low for a fair return on our investments; but at present it would seem that selling prices are about right. To the extent we believe this statement is justified we should, if possible, prevent them from going higher, notwithstanding the demand is large and urgent.

"Building operations, though important, are a small percentage of our business. Even though there should be no more new contracts for structural steel during the next six months, apparently the steel business taken as a whole would be satisfactory.

"When one considers the wealth, resources, increasing production and purchasing necessities of this country, the present business outlook is good. And this is said in the face of very heavy burdens of taxation, unnecessary and unreasonable political and social agitations precipitated by those who have nothing financial at stake, the unfortunate troubles pending in foreign countries, and the bugbear of politics.

"It must be admitted that if one reads the Congressional Record when Congress is in session and visits the rooms of the Congressional committees, where may be found organized minority groups urging propositions that have no merit, many of them with destructive tendencies, there is some ground for discouragement; but if one will turn about face and leave these circles of despondency and go out upon the farms, and in the manufactories, and along the transportation arteries, and into the active mines, one is compelled to conclude that the constructive forces of the United States are so great by comparison that the small standing army of pessimists cannot for long or to any great extent interrupt the onward march of business activity."

Observations in Foreign Lands.

In speaking of his Mediterranean trip, Judge Gary said in part:

"Every person of reasoning qualifications residing in the respective countries visited, from the highest to the lowest, is thoroughly tired of war. Its horrors, costs and destructive results have been so practically demonstrated during the last decade that the simplest mind abhors military conflict. The reasons, motives and emotions are not the same in all minds, but the conclusions are altogether or nearly unanimous. Every country would like to have peace, continuous and permanent.

"There is only one way of fairly and finally settling any controversy or question, and that is, in consonance with the principles of the Christian religion. Whenever a nation or an individual reaches the point where, as the result of war or of shipwreck, or otherwise, immediate destruction is inevitable, assent to the idea expressed is natural and well-nigh universal. There are multitudes of people who believe that the fundamental and controlling doctrine of the nation's laws should be in accordance with the principles of the Holy Bible and that every lawmaker and administrator should be compelled to indorse and practice its undeniable precepts.

Lessons of the Fall of Cities.

"One who reads of or personally witnesses evidences of the rise and fall of great nations and communities and cities, whose ruins are so great that they attract the attention and admiration of the entire world, is led to believe that an overruling God determined their destinies. Corinth, for a long time a dominating city, known as the luxurious and wicked city, today has only a small community with a few remaining magnificent ruins partly uncovered; and similar cases are numerous. Such nations as the United States, even, or Great Britain, France, Italy, Japan, China, Germany, Austria, Russia, will do well to bear constantly in mind the history of the past and the possibilities of the future. 'Let him that thinketh he standeth take heed lest he fall.'

"We should, if possible, avoid ill-natured controversies, international, national, state, municipal, public, private, political, sectarian, economic or otherwise. They are numerous at present; indeed they seem to be fashionable. Where or in whom is the blame? 'He that is without sin, let him first cast a stone.' Let us diligently search our own hearts.

"Another thing particularly noticeable at present in all southern countries is the disposition of the working classes concerning industry, frugality, economy and saving. They remind one of the ant whose hill has been destroyed, or the bee whose hive has been emptied or the bird whose nest has been tattered.

Advised to Read the Bible.

"If you should decide to visit Palestine, which it is hoped you will, before and after doing so, thoroughly read again your Bible, this classic of classics, all in all the most interesting and fascinating of books. There are contained many things which, taken literally, we may not understand. It is not necessary and it would perhaps be a waste of time to try. Our minds are too small, our understanding too limited. Possibly in some immaterial respects the published interpretations are literally incomplete, misleading or inapplicable to our time. But in the main the language, as used, is accurate and well authenticated by science and by actual observations. The moral and religious principles of the Bible, both the Old and New Testaments, have never been and can never be successfully combated. Since the preservation of history commenced there has never been anything approaching the Holy Bible as a literary production or a code for proper and desirable human conduct, or as the foundation for future hopes. If any here should believe this is an exaggeration, which is not probable, read again this book and you will be surprised. Visit Palestine in the light of and under the inspiration of the Bible. Things that could not easily be destroyed are there. The landmarks of Palestine are as described in the Bible. The River Jordan, the Dead Sea, the Sea of Galilee, Mount of Olives, the Valley of Jehoshaphat and many other places familiar

(Continued on page 1605)

Papers Read at the Institute Sessions

Blast Furnace Linings, Gas Producer Practice and Alloy Steel Rolling Mills Discussed—Rôle of Chemistry and Waste Elimination—Time Study Standards

BESIDES the usual address by Judge Gary and the report of the committee on the 8-hour problem, there were six papers presented. The blast furnace was represented by a paper, "The Disintegration of Fire Brick Linings in Blast Furnaces," by C. E. Nesbitt and M. L. Bell of the Carnegie Steel Co. There was a paper on "Gas Producer Practice in Steel Works" by Waldemar Dyrssen of the United States Steel Corporation, New York. The rolling mill was discussed by H. E. Davis, Interstate Iron & Steel Co., South Chicago, Ill., who described the features of that company's mill for rolling alloy steel. A contribution, "Standardization of Steel Mill Practice by Time

Studies" relates the experience in this field of the Atlantic Steel Co., Atlanta, Ga., the author being Robert Gregg, president of the company. The impressive rôle of chemistry in the steel industry was vividly presented by W. A. Forbes, United States Steel Corporation, New York, in a paper, "The Value of Chemistry in the Iron and Steel Industry." "Methods of Waste Elimination" in the steel industry were discussed by H. T. Morris, Bethlehem Steel Corporation, Bethlehem, Pa. No open-hearth paper was scheduled.

Abstracts of most of these papers are given on the following pages. A review of their discussion will be published in THE IRON AGE, June 7.



ROBERT GREGG was born in Atlanta, Ga., in 1885 and received degrees of B. S. in M. E. from the Georgia School of Technology in 1905, and M. E. from Cornell in 1906. He was employed by the Atlanta Steel Co., as clerk, open-hearth second helper, cost accountant and cashier and became secretary of the company in 1912, serving three years. He became secretary treasurer of the Atlantic Steel Co., successor to the Atlanta Steel Co., in 1915, serving until March 1922, when he became president, which position he has since held. Mr. Gregg was married in 1913, has one child, does not play golf, spends his vacation hunting and his favorite sport is football.

Standardization of Steel Mill Practice by Time Study

BY ROBERT GREGG

IN a general sense, time study has come to be a household word in industry. When we limit it to the steel industry, however, we run into many complications and differences, so great that it amounts almost to a separate science.

In a steel mill this phase of the work is only incidental and is confined largely to the various finishing processes. Actual practice often shows itself inconsistent with the most carefully constructed theory, and the only remedy yet found is to make due allowance next time in our theory.

Purposes of Time Study

Time study has two aims. The first is arriving at satisfactory standards; the second, offering suggestions for improvement.

By satisfactory standards is meant, primarily, production standards. It is our aim to know exactly what is the maximum capacity of every unit, and more especially to know what is the reasonably attainable output which can be expected day after day barring undue mishaps. The standards set by intelligent time study are absolutely accurate. If at some future time any wide variation between actual and standard production is observed, we may feel sure that conditions have changed.

In standardizing production, we must necessarily standardize the equipment responsible. By this is not meant the installation of labor-saving devices, but rather the utilization to the very best possible advantage of the equipment we have already. In the same manner, the standardization of production involves the standardization of personnel, and this phase shares equally with equipment in the attention of the time study man.

The second aim for time study, offering suggestions for improvement in practice, seems at first a rather bold statement. When a comparatively green man sets out (and in such a highly technical industry) to offer suggestions to men who have spent their lives in the work, it necessarily brings forth some skepticism and occasionally hostility, the combating of which demands a prodigious amount of tact. Nevertheless, many suggestions of real value are received in this way.

But perhaps of even greater importance than original suggestions are those ideas gleaned from the men who actually do the work. These are the ones who know most minutely and forcibly the details that need correction. The management, on the other hand, has most that the workman lacks, but due to this very fact it cannot stay in very close touch with details. The time study man fills the well-defined gap between these two. In addition, both management and men labor under one disadvantage which does not trouble the time study man. This is that they are accustomed to seeing things as they are and have been.

Open-Hearth Department

This department is almost entirely technical. The method of attack was to keep a minute log of the furnaces together with all auxiliary equipment which might affect their output. By this means were uncovered many delays, mostly mechanical. The greatest delay was found to be on the charging machine. Analysis indicated:

Insufficient inspection.
Design of controllers too flimsy.

The furnace personnel knew, of course, that these faults existed. The management knew also, but did

not have the specific information as to how many minutes per day were lost, and what was the exact nature of the trouble.

The following are some of the other faults which were brought to notice during the same study.

Hydraulic equipment sluggish, due to clogged pipes and worn pistons.

Exposed hydraulic piping, often broken by falling scrap.

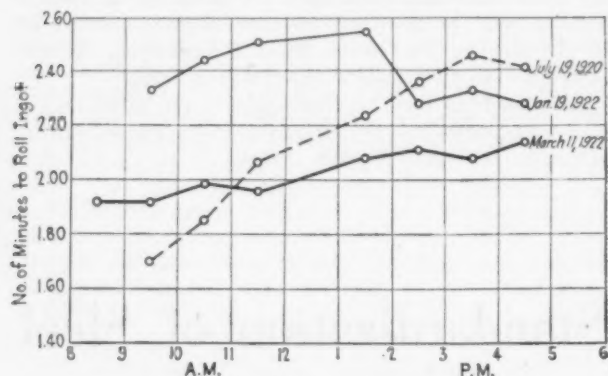
Leaks in building roof, directly over furnaces.

Scrap pans badly stocked.

Powdered coal burners too fragile and too hard to clean.

Various equipment, valves, ladle stands, motors, etc. insufficiently protected.

Steps were taken to correct all of these conditions in accordance with the recommendations. The only explanation we can offer for such a state of affairs



Record of Operations on a Blooming Mill

as existed is the inertia, as mentioned before, of personnel who had become accustomed to it.

Blooming Mill

This department is less technical than the open-hearth, and the results of time-study have been correspondingly more specific. The same sort of study was made on the rolls, and an enormous loss appeared, due to faulty heating. Curve 1, Fig. 1, shows what was happening. Early in the morning the steel was overheated and rolled very easily, quality being sacrificed thereby. During the course of the day, the steel became continually colder and the minutes per ingot rose rapidly.

The recommendations based on the study were:

Equip all soaking pits with efficient air-control.
Install water-cooled division walls.
Charge ingots differently so as to place 12 to 14 ingots in each pit, instead of 10.

These recommendations were all carried out and are now being used. In addition the mill management, surprised at the condition shown in the study, began to take vigorous steps to improve general heating practice. The result is shown in curves 2 and 3.

Both men were essential to the operation of the mill, though each was busy only about 22 per cent of the time. A similar case was found in the flying-shear scrap laborer and the cooling bed operator. The fourth man eliminated was one of two extra pulpit men.

Merchant Bar Warehouse

In this department the time element is not the first consideration. Of greater importance are space and accuracy, and it is to a large extent with these that most of our standardization work has been concerned.

A great many complaints had been coming in due to errors in counting bars. On investigation it was found that these bars were sheared in varying numbers per stroke and counted by laborers. The process, therefore, was entirely mental, and was done by men from whom no great accuracy could reasonably be expected. This condition was remedied, first, by standardizing the number of bars to be sheared at a stroke, and, second, by equipping the counters with proper registers.

The greatest problem in the warehouse was one of gaining sufficient space for the stock carried. The project of extending the building was under discussion, but we now believe that it will be unnecessary. Instead, a system of racks was designed, made of rails set upright in the floor. Each rack is wide enough for one bundle of stock and deep enough for 10 bundles. Previous to the study, bars had been piled not over four bundles deep, with rails between layers in order to slip chains through.

Hoop Mills

An interesting state of affairs was shown up by time studies on the rolls and roll-hands on different sizes of hoop. (See Table.)

A study of these averages revealed the fact that on all sizes of hoop the down-side rougher was busy almost continually. On the larger sizes, however, any other part of the mill could handle from 50 to 100 per cent more. The examples given (up-side rougher, and finishing and planishing rolls) were those parts which had most to do.

From this it appears that the mill production is limited by the speed of one man, the down-side rougher. The remedy for this was to split his work between two hands, one to handle the first and second passes, and the other to handle the third.

Results in Wire Departments

Our barbed wire mill is the most perfectly standardized department of our plant. So thoroughly have the various styles been studied that it is now possible to set accurate standards on any new style without taking further time studies. If it is found impossible to attain any standard, we would expect to find some condition wrong in the mill itself.

Our production department recently received a re-

10-In. Hoop Mill (All Time Given in Decimals of a Minute)

| Product, Inches | Finishing | Roll | Planishing | Roll | Rougher (Down Side) | | | Rougher (Up Side) | |
|--------------------|-----------|-------|------------|-------|--------------------------|------------|-------|-------------------|-------|
| | | | | | First and Second Pass | Third Pass | Idle | Busy | Idle |
| 1 3/4 x 10 | 0.054 | 0.171 | 0.064 | 0.188 | 0.131 | 0.082 | 0.001 | 0.110 | 0.115 |
| 1 3/4 x 17 | 0.138 | 0.140 | 0.102 | 0.161 | 0.143 | 0.088 | 0.038 | 0.116 | 0.148 |
| 1 1/2 x 18 | 0.138 | 0.104 | 0.118 | 0.100 | 0.106 | 0.080 | 0.016 | 0.109 | 0.079 |
| 1 x 17 | 0.120 | 0.031 | 0.113 | 0.017 | 0.117 | R | 0.008 | 0.133 | 0.011 |

("R"—repeater used to handle this pass.)

(The only quality of these curves to be considered here is their average slope. Their relative height depends on other conditions, some of which will be explained later.)

The study further showed that four men in the mill could be eliminated by combining jobs. The first set was the door-boy and the ingot car operator. The second pair to be combined were the jobs of the ingot transfer operator and the soaking pit crane helper. Studies on these men gave the following results:

| | Busy | Idle | Away | Total |
|-----------------------|--------|--------|--------|-------------|
| Transfer operator.... | 187.60 | 669.41 | 18.71 | 875.72 min. |
| Crane helper..... | 213.43 | 613.09 | 136.62 | 963.14 min. |

quest from this mill to lower the standard on a certain style of wire, since they considered it unreasonably high. This standard had been in effect for six years, and we were unwilling to lower it without a very thorough investigation. It was developed that although the men were working consistently, the machine speed on this size was only 215 r.p.m., whereas our former studies showed 235 r.p.m. Tracing this to its source, it was found that a smaller pulley had been put on the motor for making war wire, and had since been forgotten. A larger pulley was substituted, and there has been no difficulty in making standard. This is an excellent ex-

ample of the value of standards in giving warning of the existence of improper conditions.

Results in Other Departments

Repair shops in general do not lend themselves very readily to standardization of output, the reason being, of course, that a job may not recur once in a year or more. We have gained some satisfactory results, however, in standardization of conditions. The studies showed that our machine tools were cutting at from one-fourth to one-eighth of the Taylor rate. The reasons were:

Lack of instructions.
Machines in too poor condition to stand fast cutting.
Tools improperly tempered, due to lack of heat-treating facilities.

To remedy the first, forms were drawn up to be used as instruction cards for all jobs. These have never been adopted, and we are not sure that they would prove practicable, on account of the wide diversity of work mentioned above. For the second, we could only recommend that a number of machines be thoroughly overhauled, and this was done as soon as their condition was brought to the attention of the management. The third condition is one which has been met with in every

department of the plant. Tool steel is used everywhere, and the evidence of enormous losses due to haphazard methods of hardening has been consistent and conclusive. It is only recently that proper provision has been made to overcome this waste, but marked improvement is now evident.

In summary, we may say that our standardization work has paid back all that it cost plus a good profit. Not only has it paid, but it has done so under conditions about as adverse as could be imagined. One of these adverse conditions has already been discussed—the very exacting requirements of the steel industry.

Next in magnitude has been the attitude of many of our personnel in the past. It is only human for a man who has fought his way to a position of responsibility by hard work to resent any seeming interference with his authority. In the early days such opposition occurred often and violently. Gradually, as we were able to convince them that we intended no immediate harm, their attitude became one of passive acquiescence.

There are other circumstances which have hindered us—the war and its “hang-the-expense” spirit, the subsequent depression with its lowering of the morale of line and staff alike, and many smaller disturbances. But on the whole, it has been worth while.

A Motor-Driven Rolling Mill for Alloy Steels

BY HENRY E. DAVIS

THE Interstate Iron & Steel Co.'s merchant bar mill, located at South Chicago, Ill., which was put in operation on June 4, 1921, comprises an 18-in., 16-in., 14-in. and 12-in. continuous merchant mill, designed and built by the Morgan Construction Co., to roll alloy steels in sizes $\frac{1}{2}$ to 3 in. in diameter, or equivalent sections of squares and ovals, also flats $1\frac{1}{2}$ to 6 in. wide, with a minimum thickness of $\frac{3}{16}$ in. The mill is served by two Morgan, gravity-discharge, reversing continuous heating furnaces with hearths about 34 x 13 ft. These furnaces are fired from three 10-ft. gas producers.

[A complete description of the installation fills the first part of the paper.]

We find, in rolling certain grades of alloy steel, that if we have steel in all stands of the roughing mill at the same time, the motor is occasionally overloaded to such an extent that it pulls out, or the circuit breakers let go. With this condition existing and in order to avoid interruption on the finishing mills, it is necessary to rely on the table operator not to fill all passes at the same time. The lack of power in motor drives for steel mills may not be the general rule but neither is it the exception; there are times in the operation of nearly every mill when for a short period of time it is necessary to roll at a rate much in excess of the average rate that can be continuously maintained. Motors should be provided which will drive the mill at the maximum capacity for this period at repeated intervals without injurious heating.

Hot Runout Table and Cooling Bed

An interesting part of the mill is the hot runout table and cooling bed. From the finishing mill to the cooling bed the 33 table rollers are individually driven

H. E. DAVIS is chief electrician of the Interstate Iron & Steel Co., Chicago. He was born in 1883 in Osage, Kan., received a high school education and took an apprentice course in the electrical department of the Illinois Steel Co., Chicago. He then served for over 10 years in electrical work with Universal Portland Cement Co., Buffington, Ind.; Colorado Fuel & Iron Co., Pueblo, and International Harvester Co., Chicago. In 1912 he was appointed to his present position. When the Interstate Iron & Steel Co. acquired the South Chicago plant of the Grand Crossing Tack Co., he was placed in charge. The capacity of this plant has been more than trebled since it was taken over by the Interstate Iron & Steel Co.



by $\frac{1}{4}$ -hp. motors. The rolls are the standard cylinder type and are placed on the end of the rotor shaft, making the motor and roller a complete unit, which is bolted to the side of the table. Throughout the length of the cooling bed cone rollers are used, individually driven by $\frac{1}{4}$ -hp. motors. Each cone roll, with its motor, is swiveled on a vertical arm so that the angle of the roll can be changed as desired.

In operation, a bar traveling along the table travels on the high part of the roll until it reaches a position at which it is desired to place it on the cooling bed. At that instant the motors are shifted and the bar is carried broadside across the face of the rolls to the small end of the cone, reducing the traveling speed to a point where it is easily lifted off and into the first rack of the escapement bed. These motors are General Electric, alternating current, adjustable speed 210 to 390 r.p.m. and their power is furnished by the adjustable frequency motor generator set in the finishing mill motor room.

The speed at which the small motors operate is adjusted, in accordance with the speed of the finishing mill drive, by the operator, who, at the starting of the mill also starts the 93 motors by starting the frequency set. Each motor has fuse protection. They are connected to the power supply in groups of 10 and 11, and instead of connecting 10 motors in a row to a circuit every third motor is connected to the same circuit. This was done so that, if trouble occurred on any one of the circuits, it would stop only one motor out of every three. Stopping one roll would not tie up the mill, but stopping three or more in a row might. These motors require but little attention, this usually consisting of blowing them out with compressed air once a week, and an occasional oiling. Bearing trouble de-

veloped when we first started up, but has now been eliminated.

The cooling bed is 300 ft. in length and is a combination of an Edwards inclined gravity escapement bed and a horizontal notched bed, and, with the packing device, was designed especially for the accurate slow cooling of alloy spring steel bars. The packing device consists of a series of jointed bars fastened to shafts which are operated through worm gearing by a 12-hp. motor. The jointed bars are spaced three feet apart throughout the length of the bed and are located between the inclined and horizontal portions of the bed. When cooling spring steel while the packing device is in operation, the steel in leaving the inclined bed slides down the jointed bars of the packing device into the first notch of the horizontal bed then by slightly raising the jointed bars the following steel bar slides down on top of the first bar, the same operation being carried on after each bar until there is a full pack in the first notch. The jointed bars are then lowered to the starting position. The horizontal portion of the bed advances the pack by lifting and carrying it from notch to notch until it is deposited on the shuffle bars, which arrange the pieces of the pack in proper position for shearing.

The Auxiliary Control

All auxiliary motors except those on the hot runout table are 230 volt, direct current and were supplied by the Westinghouse Electric & Mfg. Co. The reversing motors are the totally inclosed M.C. type, the non-reversing being semi-inclosed S.K. type.

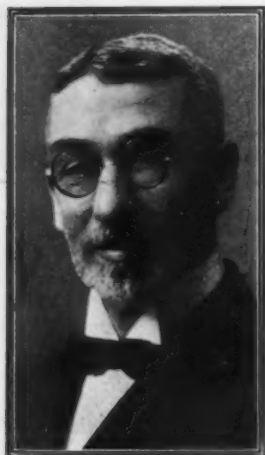
All auxiliary motor control is of the full magnetic type manufactured by the Rowan Controller Co. All of our control equipment is concentrated in three bal-

conies, located one at each end of the mill and one in the center. The center balcony is directly opposite the finishing mill stands and makes a convenient pulpit for the three transfer and table operators who have between them fourteen master switches for controlling the travel of the steel through the finishing mill. The other master switches are conveniently located for the control of the different operations. By grouping the master switches of the four tables of the roughing mill and adding a solenoid to operate the clutch on the billet dividing shear, we made it possible to get along with but one operator, the table operator now being able to operate the shear.

This control was selected because of its principle of operation and its simplicity. The principle of operation is that of acceleration, mainly by time limit under a secondary influence of current limit. This scheme aids materially in producing a control board with no complication such as small relays, etc. Our selection has stood the test of nearly two years of practical operation and the results have justified our choice.

Power is purchased from the Commonwealth Edison Co. at 12,000 volts and is stepped down to 2300 volts by three 1667 k.v.a. single phase General Electric transformers. The water supply is obtained from a pump house, located on the river bank approximately 2500 ft. from the mill, which was put in operation with the new mill. Three 4,000,000 gal. per 24-hr. capacity centrifugal pumps were installed. Two of these are sufficient to supply the plant requirements, the third being maintained as a spare.

The third reel of our motion picture, "The Story of Alloy Steel," is offered here because it illustrates the use of electric power in a merchant bar mill.



HARRY TIMOTHY MORRIS was born in Pottsville, Pa., in 1870, was graduated from Lehigh University in 1891 as a mechanical engineer and entered the employ of the Maryland Steel Co., Sparrows Point, Md., as a laborer, working upon the erection of buildings for the Bessemer and rail mills then under construction. He has since been continuously with the Bethlehem Iron Co. and its successor, the Bethlehem Steel Co., in various capacities, including superintendent of Bessemer and rail mills, superintendent armor plate department and special engineering representative on different occasions in foreign countries. Mr. Morris is now metallurgical engineer of the Bethlehem Steel Co. and a member of numerous engineering societies.

Waste In the Steel Industry and What It Means

BY H. T. MORRIS

THIS problem is so broad that nothing even approximating detailed treatment could be considered in a paper brief enough for this meeting. We are not attempting here to offer solutions of waste problems, but simply, in a general way, to enumerate some of the many wastes which are current.

Three General Sources of Waste

In the report on waste in industry and the recommendations for waste elimination, made by the committee of the Federated American Engineering Societies, the committee has conceived that a given practice is not wasteful until a better practice has been revealed. Let us today consider waste more particularly from the viewpoint which considers immediate solutions. The wastes I have in mind might be generalized into:

- 1—Waste of energy;
- 2—Waste of materials;
- 3—Waste of men;

and these wastes may be due to faulty organization, which involves faulty planning as well as faulty execution. We shall call anything waste that adversely

affects the cost sheet; and we shall remember the consumer's cost sheet as well as the producer's.

Waste in Heat

Among the more obvious wastes in our industry, waste of heat generally makes the most startling impression. Such heat wastes would include the sensible heat of pig iron and cinder just tapped; the sensible heat in steel just tapped; the sensible heat in coke just pushed from an oven; the latent heat of steam; the sensible heat of steam exhausted into the atmosphere; the waste whenever fuel is burned in air, and many other less apparent heat losses.

A radical change in blast furnace practice proposes reduction methods at temperatures far below those necessary to melt the iron ores. These methods if commercially successful would dispense with large quantities of fuel, limestone and air, and would produce iron at a temperature hundreds of degrees below the melting point with no cinder at all. Were such a process reduced to practice it would eliminate a large part of the blowing and heat recovering apparatus.

Another radical change proposes the electric deposi-

tion of metallic iron. Experiments in concentrating atmospheric oxygen foreshadow the possibility that the "wind" blown into blast furnaces may some day be largely freed of nitrogen; this would greatly diminish the cost and size of blast furnace installations but would demand better refractories.

Even if these plans become the practice of the future, immediate problems must be solved by "the near lookers" who have taken the little cold-blast furnaces of our grandfathers and have in many ways enormously improved on them. Daring changes in handling and transportation methods for both raw and finished materials have greatly lessened the labor hours per ton of product. The establishment of "direct metal" handling to the steel plant and the development of the storage "mixer" were important steps toward transforming sensible heat, once wasted, into an asset of initial heat for the steel refining furnace.

Savings at Coke Ovens and Steel Furnaces

Substantial savings have been effected in the current century through recovery of gas and valuable by-products in by-product coking ovens. The abandonment of coke quenching should be an aim, to obtain benefits in heat saving, in reduced breakage in transit, diminished fragmentation in the furnace and in increased combustibility. There is waste in producer gas, unless provisions are made for maintaining constant calorific value, and constant rate of delivery to consuming furnaces. Mechanical producers have been designed to accomplish these objects.

The modern regenerative furnace and the continuous heating furnace, using through efficient burners gas, oil or tar, embody methods of combustion and of heat utilization far in advance of the old direct fired, low roof furnace of little more than a generation ago. The movable car bottom and the electric charging and drawing machine have minimized time, labor and heat losses. Waste heat boilers now convert into steam much of the heat formerly carried into the stacks. Steam turbines using highly superheated steam are indicated as heat-waste eliminators. Their development brings problems in strength of materials, lubrication and other conditions. Internal combustion engines, already developed into great fuel savers, have still greater possibilities.

Refractory Losses

Next to fuel and labor costs stands refractories cost, the third greatest expense in steel plant operation. Waste avoidance demands that refractories betterments keep pace with other betterments in the steel industry. The past few years have seen remarkable efforts toward increased fuel economy in the open-hearth through better and quicker combustion more directly concentrated on the charge. American electric furnace developments have rapidly expanded. This has meant economies in high grade steel manufacture, and he would be rash who should deny the possibility of economies in commercial steels through further developments in this direction. Refractories have much to do with the possibilities of progress along these lines.

Economies in Rolling Mills

In the rolling mill field, continuous mills of various kinds have worked great economies, and great savings may still be expected, both through wider adoption of these devices and through improvement in devices already adopted. The way has been blazed for a general saving in driving energy, through electrification of main, as well as of the auxiliary, rolling mill drives. The ready means of distribution from generator to consuming unit suggests examination of the possibilities in the electric operation of switching locomotives. In those heating furnaces which require precise control of time and temperature, as in heat treating furnaces, the use of electricity insures the desired uniformity and temperature range to the treated objects.

Wastes in Solid and Liquid Materials

Turning from heat and power wastes to some of the many wastes of solid and liquid materials, fines

of coke, ores, limestone, flue-dust, and the like, which are produced in the operation of every steel plant, constitute waste unless efficiently utilized. Experimenters and investigators are at work on these problems and it seems unlikely that the best has yet been developed.

Methods of utilizing blast furnace slag have claimed attention. Much blast furnace slag, and still more melting furnace slag, is entirely waste under our present methods. Fields are open here for the development of better uses.

The Ingot Problem

In ingots, as prevalently designed and cast, losses occur wherever requirements exist for substantially sound and homogeneous finished product, due to the necessity of cutting considerable metal from the top end of the ingot, which usually figures as scrap and not as finished product. This waste can often be largely reduced by classification of products so that parts of these top discards can be finished into products with less exacting requirements. Many devices of more or less value have been and are being designed to reduce and localize piping and segregation.

Transportation wastes, within the plant, are frequent. Labor saving machinery is still needed to eliminate the waste of doing the hard lifting and transporting by human labor. Where large numbers of the same article or parts are to be made day after day, "single-purpose" machines have been developed with remarkable resultant economies. The wider adoption of this idea in the steel business is indicated as a trend in the future anti-waste campaign. Rust has been a universal waster wherever iron or steel is found. Doubtless, this source of waste will some day be largely eliminated.

In the current century, commencing with the development in the high-speed cutting ability of tool steel, remarkable progress has been made in the broadcasting of heat treating knowledge and in its application to a growing range of alloyed steels, so that the secret methods and compositions known before 1900 only to armor plate makers and a few others, are now widely employed in many commercial grades of steel. An army of scientists, investigators and experimenters are working in the territory of heat treated special and alloyed steels, toward the elimination of waste by reducing weight and much progress is still to be made.

Advantage of Standardization

Standardization is a valuable device in fighting waste. The instinct of standardization leads to the wide adoption of processes locally determined to be excellent or valuable. Inasmuch as the organization is largely responsible for many of the wastes that occur, and as personnel is the important factor of organization, often more important than the equipment, it seems clear that the personnel of the steel plant is one of the largest factors to be considered. The aim of the organization throughout should be to maintain fair, just and sympathetic relations with all employees. It is a wise organization which realizes in the selection of its gang-foremen that they should be men, not only technically schooled, but trained to carry on with the described standards of action. Coordination of effort is an organization problem.

Welfare of the Employee

Any consideration of industrial waste is incomplete that stops with the engineering problems encountered inside the plant. A large part of the life of every employee is lived outside of this jurisdiction, and his major interests also lie outside. With these thoughts in mind it becomes clear that a complete anti-waste program should include consideration of matters that affect the worker in his home life and in his community life. The battle against waste will have progressed far forward when all industry shall follow the lead of a large part of the steel industry in welfare work, "safety first" provisions, workmen's participation in management, service-retirement pensions, establishment of attractive homes and villages and other attacks on the waste of men.

There is one large subject of first importance to the

waste problem, to be touched upon but briefly here because it has also a large sociological bearing—unemployment. The problem deserves our continuous and most serious thought. It can be solved only after the stabilization of costs and prices. The permanent sta-

bilization of costs and prices can only be accomplished through the yielding by one group of its selfish advantages over another, and preceding this solution there must be a nation-wide dissemination and acceptance of sound economic principles.



W. A. FORBES was born at Stockton-On-Tees, England. His first employment in this country was May 1, 1895, in a chemical laboratory of Park Brothers, Pittsburgh. From Oct. 1, 1895, to April 30, 1900, he was in the chemical laboratory of the Carnegie Steel Co., Homestead, Pa. From May 1, 1900, to June 30, 1908, he was employed in the chemical laboratory in the blast furnace department of the National Tube Co., McKeesport, and at McKeesport and Joliet engaged in studies of by-product coke oven developments. Since July 1, 1908, he has been in the New York offices of the United States Steel Corporation.

Value of Chemistry in the Iron and Steel Industry

BY WILLIAM A. FORBES

BOTH the quality and amount of all materials involved in steel making processes are governed by chemical analysis, which is also employed to determine whether the steel produced is of the desired grade for rolling, forging or casting. In fact, every step in the production of steel is marked by a complete chemical analysis, from the raw materials going to the blast furnace to the final treatment before the finished part is placed in track, structure, machine or wherever it is destined to serve.

The blast furnace is frequently designated as a chemist's crucible on a mammoth scale and is operated strictly on chemical principles.

Earliest Uses of Chemistry

The first method of testing iron ores was by fire assaying in the so-called dry manner, probably originating in the sixteenth century. These tests consisted in roasting the ore and then separating with a magnet, the magnetic material being retained and used and the non-magnetic material being discarded as useless. The first laboratory where students could receive a thorough practical training in chemistry supplementary to the instruction given in the lecture room, was installed in 1825.

As an example of the progress of the application of chemistry to the iron and steel industry, the first chemist was employed in an iron or steel works laboratory in this country in 1860 when Captain R. W. Hunt was engaged by the Cambria Iron Co. in this capacity.

It is only fifty years since construction of the great Edgar Thomson Works was commenced, namely, 1873. At that time, while it was considered that a chemist in the works might be of some use, he was regarded largely as an unnecessary evil.

Chemistry shows us, for each of the various processes employed in the manufacture of iron and steel, the ores, coals, limestone, etc., which are best suited so far as chemical composition is concerned. Indeed, without chemistry, the manufacture of steel from ores high in phosphorus for instance, as discovered by Thomas and Gilchrist, which discovery led to the basic Bessemer and basic open-hearth processes, would probably have been impossible, or at any rate would have been long deferred.

In the manufacture of coke, one of the principle raw materials employed in the manufacture of iron, the development of by-product coke ovens can unquestionably be credited to the application of chemistry, inasmuch as the commercial saving of the by-products overcomes the very much greater investment

cost of by-product coke ovens as compared with bee-hive coke ovens.

Chemistry in Blast and Steel Furnaces

Iron smelting in the blast furnace or chemist's crucible may be briefly described as a series of reducing and fluxing processes, the oxide of iron in the ore losing its oxygen to the carbon of the coke, while the impurities in the ore, such as silica and alumina, chemically combine with the lime and magnesia of the limestone, or dolomite, and form a slag. In no part of the manufacture of iron and steel has the chemical laboratory and the application of chemistry been of greater service than in affording the necessary close control in the operation of the blast furnace for the production of pig iron.

Pig iron is converted into steel by two main general processes now in vogue, namely acid, or basic, or a combination of both. The designation "acid" is chemical in metallurgy and is applied to those non-metallic elements which combine with oxygen to form acids. The designation "basic" used in metallurgy is also chemical and applies to metallic elements and substances which combine with oxygen to form bases.

In the basic Bessemer process, this oxidation of phosphorus is accomplished by blowing air through the iron in the converter and lime is added to the converter to absorb the phosphoric acid thus formed. The resulting slag, containing 18 to 22 per cent of phosphoric acid, is highly regarded as a fertilizer and all produced is used for this purpose. In the basic open-hearth process, the oxygen required for the oxidation of the phosphorus in the iron to phosphoric acid is supplied by iron ore, which is oxide of iron.

The acknowledged inferiority of basic Bessemer steel, as compared with acid Bessemer or acid open-hearth or basic open-hearth steel, is due mostly to the inclusion therein of dissolved oxide of iron. We do not believe a satisfactory method of chemical analysis for determining this impurity, namely, oxide of iron dissolved in steel, has yet been developed, but we hope chemistry will before long contribute this much desired aid to the art of steel making. Similarly the character, amounts and effects of occluded gases in steel have not been satisfactorily entirely solved as yet, and there is quite a field for chemical research in this item.

In Crucible and Electric Steel

In the crucible process the chemical reactions are much more simple. The metal is overlaid with a slag, which, though not as oxidizing as the open-hearth slags, is much more oxidizing than the electric furnace slags.

In the electric steel process, both carbon and silica

exist in the slag, and not in the container, and it is possible to make low carbon steel in the electric furnace, as well as to eliminate both phosphorus and sulphur from inferior raw materials. For the removal of phosphorus it is necessary to add iron ore to provide an oxidizing slag which will oxidize the phosphorus to phosphoric acid and then combine it with the lime to form phosphate of lime; but after the removal of the slag containing the phosphorus a second slag is used, which is so highly reducing, due to the presence of finely divided carbon strewn over it, that not only is all the iron oxide in the slag reduced, but the oxides which rise from the metal into the slag are continuously reduced. This action may be compared to the action of a blotter soaking up a pool of ink, where successive blotters are used until eventually all the ink has disappeared and the last blotter remains clean.

So strong is the reducing action that manganese ore may be reduced to manganese and pass into the bath, tungstic acid reduced to tungsten, vanadic acid reduced to vanadium, chromic oxide reduced to chromium, silica reduced to silicon, and so on with most of the metallic oxides, so that it is only a matter of electrochemical calculation to determine in advance how much ore, how much reducing agent in the form of carbon and how many thermal units in the form of kilowatt hours are necessary to give any required amount of any desired element, without employing the pure metal or a ferroalloy as a means of making the various alloy steels.

Many thousand tons of coal, in the form of producer gas, are used every year for the melting and heating of steel. The conversion of the coal into the more convenient gas is a chemical process. Although gas was made from coal before the chemical operations were understood, the knowledge of the chemistry of the gas producer enables us to make better gas and use the coal more efficiently.

In order to have a check on the chemical reactions going on in the gas producer, we send samples of the gas to the laboratory and find the quantities of CO, CH₄, C₂H₄, and H contained therein to determine the thermal value of the gas, and in addition to this we learn from the content of CO₂ whether the gas is being burned and consequently wasted in the gas producer instead of being delivered to the furnace. This has become so important that now continuous sampling and analyzing are automatically performed.

The application of chemistry to the development of suitable refractories for furnace linings, of various characters to suit the steel processes developed, has been extremely beneficial. It has resulted in the application, among many other materials, of chrome ore, bauxite and zirconia, which latter is probably the most refractory material known, withstanding a heat of 4000 deg. Fahr. before melting.

It was not until 1786 that iron carbide and graphite were isolated, leading the way to the knowledge of the part played by carbon in the conversion of iron into steel, and it was later developments in chemistry that paved the way to our present knowledge of the various forms in which carbon exists in steel.

Chemistry in Alloy Steels

Chemistry is directly responsible for the production of alloy steels which are now used to such a great extent. The chemist does not impart the resulting qualities or actions to alloy steel, but by means of chemistry he was in the first place able to isolate the materials and elements used in its manufacture, and then by chemical analysis to control the composition of the product. Alloys are no longer considered as simply a mixture of two metals as formerly, but are recognized now as being solid solutions, in other words, nickel for instance dissolves in steel, just as sugar dissolves in water.

Some alloy steels develop odd contradictions in their own composite qualities; for instance, iron is the most magnetic metal known and manganese also is magnetic, but their alloy, manganese steel, is entirely non-magnetic. Nickel also is magnetic, but a nickel steel containing 25 per cent nickel is not magnetic and resists corrosion very well, and a steel containing 36

per cent nickel neither expands nor contracts with varying degrees of temperature.

Steel containing 12 to 14 per cent of chromium constitutes stainless steel. A still more recent development is that of rustless iron or stainless iron, which is the same material as stainless steel excepting that the carbon content is very low, permitting the material to be worked into sheets for deep stamping: for instance, for cooking utensils, wire and many other articles of manufacture where resistance to oxidation and to heat and corrosion in the air is of great importance. Permalloy is an alloy of iron and nickel which is likely to be valuable for electrical work. Tungsten is alloyed with steel to give the so-called high-speed steels. Molybdenum is similarly used though it does not impart the desired qualities to the extent that tungsten does. Protection from corrosion is secured through the alloying of copper with steel, the addition of as small an amount as one-quarter of one per cent of copper affording excellent results.

Chemistry in Heat Treatment

After steel is rolled, forged, cast or machined to required dimensions, it is often desired to impart certain special properties, and this can be done through the agency of chemical processes. Steel may be case hardened by being packed in some carbon producing substance (generally wood charcoal) and subjected to heat.

Again, white iron in which the carbon is practically all combined and which is very brittle, can be converted into "black heart" malleable iron, which is decidedly the opposite of brittle, by heating the white iron for a number of days packed in some protecting material, such as iron ore, the combined carbon being converted into graphitic carbon in this treatment.

To bring out the latent qualities of steel, heat treatment is often employed, and this effects structural changes which bring about increased strength and hardness or ductility, depending upon the character of treatment to which the steel is subjected.

Directly or indirectly, many chemicals and chemical processes are involved in the production of steel and are used in connection with equipment of plants at which steel is produced. Indeed, it would be impossible to manufacture steel by modern methods without these chemicals and a knowledge of their commercial application to the steel industry. One of the most important is sulphuric acid, which is used principally for the recovery of ammonia products from gas and for "pickling" finished steel products that require an absolutely clean surface. It is estimated that the iron and steel industry uses in the neighborhood of 15 per cent of the total sulphuric acid manufactured in this country for pickling and the manufacture of sulphate of ammonia.

Sulphur from Furnace Slag

There are great possibilities for obtaining sulphur as a by-product of the iron and steel industry. During the war when scarcity of sulphur in Germany was very great, experiments were made to recover sulphur from blast furnace slag, and the results were so encouraging that a plant was built. The slags used contained from 1 per cent to 2.25 per cent of sulphur, averaging about 1.50 per cent. The United States produces approximately 20,000,000 tons of blast furnace slag per year, containing sufficient sulphur to make enough sulphuric acid for all the requirements of the steel works in the country.

Rôle of Electrochemistry

We have referred to the part chemistry plays in the metallurgy of electric steel processes, but there is another field of chemistry which is becoming broader every day and more important in filling the wants of civilization: this is electrochemistry. The wonderful development of the production of electric power by means either of water or fuel has been coincident with the development of electrothermal or electrochemical processes. Electrolysis is not a new thing, but only a few years ago we could not have anticipated that large tonnages of zinc would be extracted from the ores electrolytically.

While we talk about the wonderful development of the automobile, we must remember to what an extent the automobile industry is indebted to alloy steels and that the manufacturer of alloy steels is dependent upon the use of ferroalloys, most of which are produced in electric furnaces and are the direct result of the research of electro-chemists.

While inorganic chemistry has become the tool and everyday necessity of steel men, and while physicists are learning more about the nature of electricity and electrical engineers are studying how to give us this valuable form of energy in cheap and convenient form, it is difficult to see the end of the possibilities of the development of electrochemistry and the part it may play in the steel industry. In further development of chemistry we must be careful we are on the right track, otherwise retardation of the art will result.

Catalysis and Colloid Chemistry

What does the science of chemistry in the iron and steel industry hold for us in the future? Considering the tremendous progress which has occurred in the last 300 years, who can now predict what will be accomplished in the next 300 years? Will chemists of 100 years hence regard as academic or futile our present day results of which we are so proud, just as we look back on the days when chemical theories appeared just as sound to the chemists of those days as ours do to us today and which later were proved to be unsound and a retardation to the progress of the art? The day may come, and, judging from past history, it will come, when our present chemical theories will be replaced. What will bring this about it is now impossible to state.

There exist certain substances which may lie in a vessel seemingly inert and yet by their presence determine occurring reactions. A substance which has this power is designated as a catalyst and the process

is termed catalysis. For instance, the presence of a very small quantity of platinum permits the combination of large quantities of atmospheric nitrogen with hydrogen forming ammonia, this constituting one of the main features of the Haber process for the fixation of atmospheric nitrogen as ammonia. The platinum used is not exhausted in the process, but can be used over and over. Possibly the day will come when impurities will be removed from iron ores by catalytic action in simple inexpensive equipment replacing the present expensive smelting operation.

Perhaps colloidal chemistry will solve some of our future problems in the iron and steel industry. Colloidal chemistry is concerned with that state of matter in which minute particles of a substance are distributed or suspended throughout another substance. These particles of matter are below the range of microscopic vision, but can be seen by means of refracted light in the ultra-microscope actively moving about as if they were possessed of life.

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The importance of iron oxide colloids is already recognized, and it is possible that the study of colloidal chemistry may teach us more than we now know concerning the constitution of steel. It is already being applied to the corrosion of steel.

The important question remains: How may further progress in the application of chemistry to the iron and steel industry be maintained? The answer is: In untiring and unremitting research.

[A valuable appendix of the chemical and radio elements arranged chronologically is part of the paper.]



WALDEMAR P. G. DYRS-
SEN was born in Stockholm, Sweden, May 29, 1886, and was graduated from the Royal Technical University, Stockholm, in 1908. He was mining and metallurgical engineer, construction department, Les Petits Fils de Francois de Wendel et Cie., Hayange, Lorraine, 1909; superintendent of blast furnace and open-hearth departments, Uddeholm Co., Hagfors, Sweden, 1910-1912; and in the construction department, Bethlehem Steel Co., 1913-1914. Since 1915 he has been metallurgist for the United States Steel Corporation, New York.

THIS paper of 67 pages is an exhaustive discussion of many phases of this important subject. An adequate abstract is not possible here. It is fully illustrated with half tones, charts and tables. The author takes up laboratory experiments first and then discusses the heat and chemical balance in producers. Gas from bituminous coal is then taken up followed by the efficiency producers, hot raw versus cool clean producer gas, the ash fusing producer and the temperature of the gas. Other points discussed are the following:

Blast temperatures and steam consumption, the use of oxygen in gas producers, influence of rate of gasification, instruments required for controlling and supervising the operation of gas producers, pre-heating the blast, other cooling mediums than steam in gas producers, cooling producers with blast furnace gas, and the savings possible by using waste gases in place of steam for cooling the fire zone. The paper concludes with a review of the modern types of gas producers such as the Chapman, Hughes, Hughes-

Theory of Gas Producer Practice in Steel Works

BY WALDEMAR DYRSSEN

Wellman, Herperly and others, followed by a summary which is as follows:

Summary

1. Laboratory tests of the balance between air, CO₂, H₂O and C have hitherto been conducted under conditions so different from the conditions in the gas producer that such tests cannot be applied to the gas producer.

2. Balance diagrams of the two systems CO₂, CO, C and H₂O, H, CO₂, CO, C have been worked out which are applicable to gas producer practice.

3. By application of the laws of thermo-chemistry to these diagrams, conclusions are effected embracing all the factors that play a part in coal gasification.

4. The results obtained are compared to actual gas producer practice and check very closely with the best results obtained with both coke and bituminous coal.

5. A simple method is given for comparing the quality of the producer gas from practice with the theoretical gas.

6. The influence of the temperature of gasification is discussed and it has been shown that a temperature between 2000 and 2200 deg. Fahr. gives the highest producer and combustion efficiency of the gas.

7. The gas made at 2000 deg. Fahr. from ordinary bituminous coal should show the following analysis by

volume of dry gas (H_2O and tarry vapors not included); C_2H_4 , 0.6; CH_4 , 3.6; CO , 29.1; H , 13.3; total combustibles, 46.6; CO_2 , 3.4; N , 50.0.

8. Producer efficiency is discussed and a basis given for the calculation thereof.

9. Hot raw gas versus cold clean producer gas is discussed. In open-hearth practice hot raw gas is a necessity. For small heating furnaces spread over a large area, clean gas has certain advantages.

10. The ash fusing producer is discussed. The efficiency of this producer cannot be expected to be as high as that of the ordinary producer, except under special conditions, and it is improbable that it will come into more general use.

11. The temperature of the gas from the producer is discussed. It is shown that on each fuel there is a certain low temperature which indicates that the condition of gasification is correct and that the fuel bed is uniform and free from blowholes. When this temperature is exceeded, the quality of the gas is reduced. This temperature is about 1100 deg. Fahr. for Western high moisture, high volatile coal and about 1200 to 1300 deg. Fahr. for Eastern gas coal.

12. The influence of the temperature of the blast is discussed. The temperature should not exceed 131 deg. Fahr. and in most producers it should be 2 to 4 deg. lower.

13. The use of oxygen in gas producers is discussed. Very high efficiencies can be obtained therewith, but in steel works practice the cost of oxygen must be lower than 30 per cent of the cost of coal to show a saving. With oxygen it is impossible to make so-called "city gas" and transfer nearly all the heat in the coal into calorific heat in gas.

14. Rates of gasification are discussed. Rates as high as 50 lb. of coal per sq. ft. per hr. are possible in modern mechanically operated producers, with ash zone agitation, on both Eastern and Western bituminous coal.

15. Instruments required for controlling and supervising the operation of gas producers are discussed. It is shown

that a pyrometer for measuring the gas temperature is the most important instrument and that with a recording pyrometer gas analyses are not required. The instrument next in importance is a thermometer for measuring the blast temperature.

16. The influence of preheated blast is discussed. Higher producer efficiency can be obtained thereby, but the heat required must be derived from waste heat in order to obtain economy.

17. It is pointed out that great savings in operation can be effected by using waste heat to supply the moisture in the blast. Even if waste heat boilers are used with the open-hearth furnace, the waste gases contain sufficient waste heat to produce this moisture.

18. Waste gases, as a cooling medium in producers in place of moisture is discussed. Waste gases with a lower ratio of N to CO_2 are superior. Those from the blast furnace stoves have the lowest ratio N to CO_2 , do not contain sulphur, and constitute therefore an ideal source. With the use of waste gases, the producer gas will contain CO instead of H which is desirable for open-hearth furnaces. Higher producer efficiency than that obtained by the H_2O cannot be expected, except with preheated waste gas blast.

19. The use of blast furnace gas as a cooling medium is discussed. In this relation there are two outstanding factors, (1) the substitution of 15 to 20 per cent of the coal fuel by heat in the blast furnace gas results in a fuel lower in sulphur, a desirable factor in open-hearth operation; it also permits the use of a higher sulphur coal. And (2) the efficiency obtained is high and the heat in the blast furnace gas is transferred into a high grade fuel that can be used in open-hearth furnaces.

20. The savings possible with waste gases or blast furnace gas are discussed. Practically all of the steam cost under present practice and prices, 35 to 70c. per gross ton of coal, can be saved.



M. L. BELL

Disintegration of Fire Brick Linings in Blast Furnaces

BY C. E. NESBITT AND M. L. BELL



C. E. NESBITT

C. E. NESBITT and M. L. BELL, research engineers, Carnegie Steel Co., Pittsburgh, are joint authors of this paper. Mr. Nesbitt is a native of Columbus, Ohio, and was graduated from Ohio State University in 1904 in chemical engineering. He has been chief chemist of the Edgar Thomson Works, Carnegie Steel Co., and for the past 10 years has done considerable research work, chiefly in refractories. Mr. Bell was graduated from the New York State School of Ceramics, and has been a co-worker with Mr. Nesbitt as a ceramist at Edgar Thomson Works.

DISINTEGRATION as applied to iron blast furnace linings describes a cracked, shattered or crumbled condition of some of the bricks found in a used lining. The degree of disintegration may vary from a few cracked bricks to linings in which all resemblance to a brick has been lost and only a coarse, sandlike material remains. Such material is gray or almost black, contains black spots of soft carbon and crumbles easily in the fingers.

While varying in type and character, disintegration will occur generally as a vertical band or zone of broken, crumbled bricks, not quite parallel with the inner face of the lining, but gradually approaching the steel shell as it extends down the furnace, reaching at times from the top of the furnace to below the mantel. In different linings, or even in the same lining, the zone may vary from a few inches to more than a foot in thickness (Figs. 1 and 2).

In a single furnace, disintegration may be found at a certain level only to disappear at a lower level,

possibly to reappear on the opposite side of the furnace. Besides occurring more or less locally, the occurrence is further complicated by the fact that a good or perfectly sound brick is often found among bricks completely disintegrated, or the reverse (Fig. 3).

The carbon found in disintegrated linings is usually of a soot-like nature distributed throughout the brick in spots varying in size from those hardly visible to others of $\frac{1}{2}$ in. or more in diameter. At times the carbon is hard, partly graphitic in character, radiating from a small dark spot at the center. These carbon spots are weakly magnetic, indicating the presence of iron.

Linings in ferroalloy furnaces have a shorter life and show greater disintegration than those making iron. The greater coke consumption gives a higher temperature and a greater volume of gases. The gases themselves differ. The gas from the top of a furnace making ferromanganese is 50 per cent higher in carbon

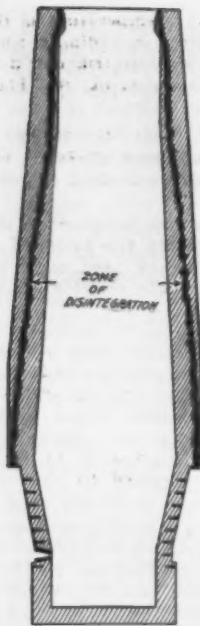


Fig. 1—Disintegrated Zone in Blast Furnace Lining

integration or in the joints. Lead is principally found metallic in globules. The retorts and condensers used



Fig. 4—Looking Down into Blast Furnace after Blowing Out

in the zinc industry do not disintegrate, although they absorb zinc to a much greater extent than any bricks in a blast furnace lining (Fig. 5.)

Alkalies are volatilized by the furnace heat and combine with the bricks where the temperature is high and where there is little, if any, disintegration. Bricks taken from used linings and not disintegrated have shown more than 10 per cent of alkalies.

Furnace bricks change in composition in service. In Table I a number of analyses of fire bricks, before and after service, are given. The samples after service

monoxide than that from an iron furnace. Disintegration seems to be greatest at 40 to 50 ft. from the top of furnace, and appears more prevalent today than 15 to 20 years ago.

Considerable data have been reported from study of the reactions of carbon monoxide with various metals and oxides. Sir Lowthian Bell found that ferric oxide was deoxidized by carbon monoxide, accompanied by a deposition of carbon at all temperatures between 150 deg. C. (300 deg. Fahr.) and a bright red heat. Deoxidation and carbon deposition were at a maximum at about 417 deg. C. (783 deg. Fahr.). Bernhard Osann found that when iron ores were subjected to carbon monoxide between 430 deg. and 500 deg. C. (806 to 932 deg. Fahr.) carbon was deposited.

Apparently neither lead nor zinc causes failure by disintegration. These metals are often found in bricks, but mainly in the cracks already opened by disintegration or in the joints. Lead is principally found metallic in globules. The retorts and condensers used

were taken from the highly heated end of the bricks after about 3 in. from the inner face of the brick had been removed. While these bricks had undergone a marked change in ferric oxide and alkalies, and had absorbed carbon, none had disintegrated. Analyses of bricks from the center or cooler portion of the lining showed little change in composition other than having absorbed carbon, yet they were badly disintegrated.

Table I—Typical Analyses of Blast Furnace Bricks, Before and After Service in an Iron Blast Furnace

| Percentage of Sample | Before Service 1 | After 5 Years' Service; Distance From Top of Furnace | | | |
|--|------------------|--|----------|----------|--|
| | | 55 Ft. 2 | 65 Ft. 3 | 75 Ft. 4 | |
| Silica (SiO ₂)..... | 57.64 | 44.74 | 44.70 | 41.40 | |
| Ferric oxide (Fe ₂ O ₃) | 0.71 | 2.88 | 3.14 | 3.75 | |
| Alumina (Al ₂ O ₃).... | 41.17 | 34.25 | 36.35 | 34.23 | |
| Lime (CaO) | 0.32 | 1.46 | 2.50 | 0.70 | |
| Magnesia (MgO).... | 0.24 | 0.20 | 0.31 | 0.18 | |
| Titanium (TiO ₂).... | | 2.11 | 2.11 | 1.98 | |
| Potassium (K ₂ O).... | 0.62 | 4.91 | 7.97 | 6.90 | |
| Sodium (Na ₂ O).... | 0.10 | 7.82 | 1.83 | 6.16 | |
| Carbon (C)..... | | 0.25 | 0.85 | 4.58 | |

Our Investigations and Results

If a brick contains free or loosely combined ferric oxide, large volumes of carbon will be deposited when

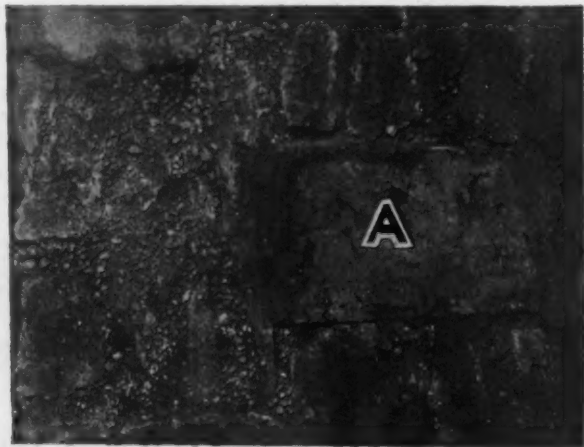


Fig. 3—Sound Brick (A) Surrounded by Disintegrated Bricks in a Blast Furnace Lining

carbon monoxide is passed over the bricks, between certain temperature ranges. When this reaction is carried on within the body of a brick a disruptive force is produced sufficient to fracture the brick. Such a reaction would produce all the characteristics of brick failures in furnace linings. It remains, therefore, to determine in what form the iron must exist, and the conditions most favorable for carbon deposition.

In the examination of a furnace which had been run on ferroalloys for 16 months, the lining was found to be badly disintegrated from top to bottom. The zone of disintegration could be traced distinctly from the top of the furnace, where it was only a few inches back from the inner face, to the lower levels, where it was 35 in. from the inner face at 55 ft. from the top of the furnace (Fig. 2). Such a condition pointed to the importance of temperature as affecting disintegration. In addition, the carbon monoxide in the ferro furnace was 50 per cent higher than in an iron furnace. We believed the concentration of the carbon monoxide had an important influence on the rate of disintegration.

To produce disintegration in the laboratory we began by exposing bricks to blast furnace gas from a few minutes to several hours and at temperatures from 350 deg. to 1000 deg. C. (662 deg. to 1832 deg. Fahr.). It was found that, when using blast furnace gas containing from 20 to 25 per cent of carbon monoxide, the action on the bricks was very slow. If a gas containing 90 per cent of carbon monoxide be employed, a brick susceptible to disintegration could be shattered in from 6 to 10 hr.

To test regular full-size bricks, a rectangular cast iron box sufficiently large to hold 12 9-in. bricks was made. The box was equipped with a close-fitting cover which could be sealed gas tight with refractory cement. Gas pipe connections enabled gas to enter at



Fig. 2—Zone of disintegration (B) is a Blast Furnace Lining, 55 Ft. from Top of Furnace. A shows the inner face of the lining

the upper corner of the box and escape at the diagonally opposite lower corner. The sealed box could then be placed in a gas fired furnace and uniformly heated, while the carbon monoxide gas was being passed

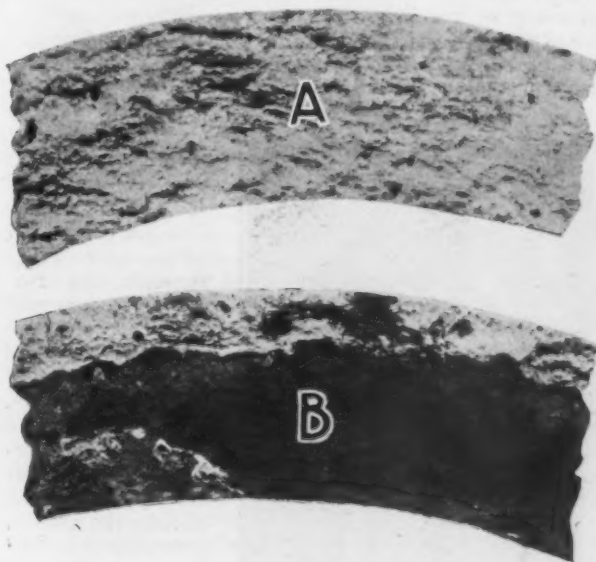


Fig. 5—Unused (A) and Used (B) Sections of Zinc Retorts. In service, B absorbed 12 per cent of zinc without disintegration

through it. A typical analysis of the gas entering and leaving the disintegrating chamber is as follows:

| Percentage of | Entering | Leaving |
|----------------------|----------|---------|
| Carbon monoxide..... | 92 | 51 |
| Carbon dioxide..... | 2 | 29 |
| Hydrogen..... | 3 | 10 |
| Nitrogen..... | 2 | 10 |

(To be concluded)

Moving Picture of Submarine Cable

A moving picture, "Laying of High-Power Submarine Cable in San Francisco Bay," followed Judge Gary's address. It was explained by C. F. Hood, American Steel & Wire Co., Worcester, Mass., the company which produced the cable. THE IRON AGE published a brief description of the method of laying this cable in its issue of Jan. 25, 1923.

For some time past the Ford Motor Co., Detroit, has been experimenting with the manufacture of all textiles used in the making of Ford vehicles. Different methods of weaving and various types of machinery have been tried.

The Newport Rolling Mill Co., Newport, Ky., is installing equipment for the production of high-grade black sheets. The company is at present operating 18 out of 20 mills and expects to be operating 100 per cent within the next two weeks.

The Baltimore & Ohio Railroad Co. has announced an increase of 3c. per hr. for machinists, carmen, sheet metal workers, boilermakers, blacksmiths, electricians and their helpers and apprentices.

BOILER TUBE PRICES

Current Quotations in the Charcoal Iron Products Compared with Other Years

Although the recovery in prices of charcoal iron boiler tubes from the low point of depression which followed the 1920 boom has been rapid and sharp, current quotations are well below the peak levels either of 1920 or those of early 1917, before prices of all iron and steel products were established by the War Industries Board.

As representative of a considerable percentage of the production of charcoal iron tubes, prices of 2-in. No. 13 gage tubes are taken for purposes of comparison. It will be noted in the accompanying table that the War Industries Board schedule on this size was list plus 22½ per cent, this being equivalent to \$216.22 per net ton. It is a matter of record, however, that prior to the "fixing" of prices, this size of tube sold at list plus 50 to 55 per cent. The post-war price adjustments carried the price down 11½ points from the War Industries Board base, or about \$22 per net ton. This was followed by an advance of 5 points, or about \$9 a ton. From that point, reached July 26, 1920, the price receded steadily until as of June 13, the quotation was 25.5 and 5 per cent off list, which figured out a net ton price of \$119.50. On July 28, 1922, prices began to move upward and from 25 and 5 per cent off list, as of that date, the market has advanced to its present level of 2 per cent off list. The present price of this size tube is \$30 per net ton below the post-war peak, almost \$44 a ton below the War Industries Board schedule, and on an average \$100 a ton below the early 1917 levels.

The net ton prices in the table prior to 1916 are figured at the average mill weight, or 2.08 lb. per ft. for standard gage 2-in. tubes. From 1916 to the present time the price has been figured on the specifications of the American Society of Mechanical Engineers, requiring a heavier gage, which for 2-in. standard tubes has meant an average mill weight of 2.37 lb. per ft.

Charcoal Iron Boiler Tube Discounts and Price per Net Ton
f.o.b. Pittsburgh for 12 Years

| Date | Charload Discount | Size | Per Net Ton |
|---------------------|-------------------|--------------|-------------|
| Feb. 18, 1909..... | 45 | 2-in. No. 13 | \$111.08 |
| July 24, 1912..... | 48 | 2-in. No. 13 | 105.00 |
| July 1, 1913..... | 46 | 2-in. No. 13 | 109.04 |
| Jan. 2, 1914..... | 49 | 2-in. No. 13 | 102.98 |
| May 1, 1914..... | 50 | 2-in. No. 13 | 100.96 |
| April 20, 1915..... | 53 | 2-in. No. 13 | 94.90 |
| Oct. 29, 1915..... | 51 | 2-in. No. 13 | 98.94 |
| Jan. 20, 1916..... | 43 | 2-in. No. 13 | 100.59 |
| Nov. 15, 1917..... | 22½ on | 2-in. No. 13 | 216.22 |
| Jan. 1, 1919..... | 19½ on | 2-in. No. 13 | 210.92 |
| Mar. 31, 1919..... | 10 on | 2-in. No. 13 | 194.12 |
| Jan. 1, 1920..... | 10 on | 2-in. No. 13 | 194.12 |
| July 26, 1920..... | 15 on | 2-in. No. 13 | 202.94 |
| Dec. 20, 1920..... | 10 on | 2-in. No. 13 | 194.12 |
| Jan. 19, 1921..... | List | 2-in. No. 13 | 176.47 |
| Apr. 20, 1921..... | 10 | 2-in. No. 13 | 158.82 |
| July 14, 1921..... | 20 | 2-in. No. 13 | 141.18 |
| Sept. 22, 1921..... | 25 | 2-in. No. 13 | 132.35 |
| Feb. 23, 1922..... | 25-5 | 2-in. No. 13 | 125.71 |
| June 13, 1922..... | 25-5-5 | 2-in. No. 13 | 119.50 |
| July 28, 1922..... | 25-5 | 2-in. No. 13 | 125.71 |
| Aug. 24, 1922..... | 18 | 2-in. No. 13 | 144.71 |
| Sept. 28, 1922..... | 13 | 2-in. No. 13 | 153.53 |
| Dec. 6, 1922..... | 8 | 2-in. No. 13 | 162.35 |
| Mar. 15, 1923..... | 3 | 2-in. No. 13 | 171.18 |
| Apr. 12, 1923..... | 2 | 2-in. No. 13 | 172.94 |

New Type of Open-Hearth Reversing Valve

Self-Contained and All Above Ground—Permits Regulation of Gas and Air Supply—Without Internal Moving Parts

BY JOHN NELSON

FOR all types of regenerative furnaces the Morgan Construction Co., Worcester, Mass., is now offering the Isley combination air and gas reversing valve, the construction and operation of which constitute a departure from other types of reversing valves now in use.

Fig. 1 shows the original installation of this reversing valve in operation with a 35-ton open-hearth furnace at the plant of the Tremont Nail Co., Tremont, Mass., where it has been given a long test under practical working conditions and where at present six valves are in operation.

Fig. 2 is a vertical section through the valve and underground flues, with the valve in position to pass the incoming gas and air to the regenerators.

Fig. 3 shows the general arrangement of two duplicate electrically driven valves in relation to the regenerators and stack of an open-hearth furnace. It will be noted that the gas and air pass to the furnace through one valve, while the products of combustion flow from the furnace to the stack through the other valve, thus allowing independent regulation for each end of the furnace. By reversing both valves from the position shown, the direction of the gaseous currents is reversed through the furnace.

It is claimed for the valve that it fulfills various requirements which have been long sought and which the inventor, George H. Isley, had in mind while evolving the idea, in that it is self-contained with all parts above ground and accessible from the outside; that all joints are leak-proof and the seals sufficient to provide for maximum pressure and draft caused by clogged checkers; that there is the least possible amount of radiating surface, all metal, where practicable, being lined with insulating material; that soot cannot accumulate on the inside and form an obstruction to the path of the gases; that waste of gas is avoided by closing the gas supply during reversal, the fresh gas being shut off automatically while actual reversal takes place; that the volume of air and gas passing to the furnace may be easily regulated; that, since quick repairs to the furnace are often necessary, the reversing apparatus is arranged for centering conveniently the furnace, connecting all four regenerators with the stack at one time; that the fresh gas cannot enter both ends of the furnace at one time; and that the sequence of operations in reversal is such that the fresh gas trapped in the gas regenerators and flues at each reversal may pass through the furnace and be utilized rather than be permitted to escape to the stack.

When the furnace is in operation, producer gas at

approximately 1000 deg. and air at atmospheric conditions enter one valve, pass through the flues to the regenerators, and ascend through the checkers, increasing in temperature to nearly the prevailing temperature of the furnace, and finally issue from the ports and unite in the furnace, where combustion takes place. The products of combustion at approximately 3000 deg. pass out of the furnace on the opposite end and descend through the regenerators, circulating around and heating the checkers therein, and finally, at about 1000 deg., pass through the other reversing valve to stack.

At intervals of about 15 min. the reversing valves are manipulated so as to change the direction of the currents through the furnace. In this way the checkers are alternately heated by the products of combustion from the furnace and cooled by the incoming fresh air and gas, which take up the heat as described.

As will be seen in Fig. 2, the water seal base of the Isley valve has openings corresponding to the gas inlet, gas and air regenerators and stack terminals. Mounted over the base is a

brick-lined movable hood structure. In the position shown, one hood connects the gas inlet with the gas regenerator terminal, while the other hood seals the passages to the stack. A cover over the gas inlet is hinged to the base and held open by the lower edge of one end of the hood structure for the gas to enter. Hinged to the opposite end of the hood structure is a plate steel lid which serves to control the volume of air passing from the atmosphere to the air regenerator.

A motor-driven worm gear reduction unit, attached to one end of the base and connected with the hood structure by means of bell cranks and connecting rods, serves to move the hood structure from the position shown to its reversed position, in which the inlet port is closed and the products of combustion are permitted to pass to the stack. In the meanwhile, the valve at the other end of the furnace has reversed and permits the entrance there of air and fresh producer gas.

The small cover over the gas inlet plays a very important part in the operation of this valve. It is used for regulating the volume of gas passing to the regenerator. It automatically shuts off the supply of gas before the hood structure breaks seal with the base while reversing, and seals the supply terminal when the hood structure is in the reversed position, at which time the cover is exposed to the cooling effects of the atmosphere. The cover is made of plate steel and it may be of interest that those furnished with the valves of the Tremont installation are in substantially as good condition as when first operated 4 years ago.

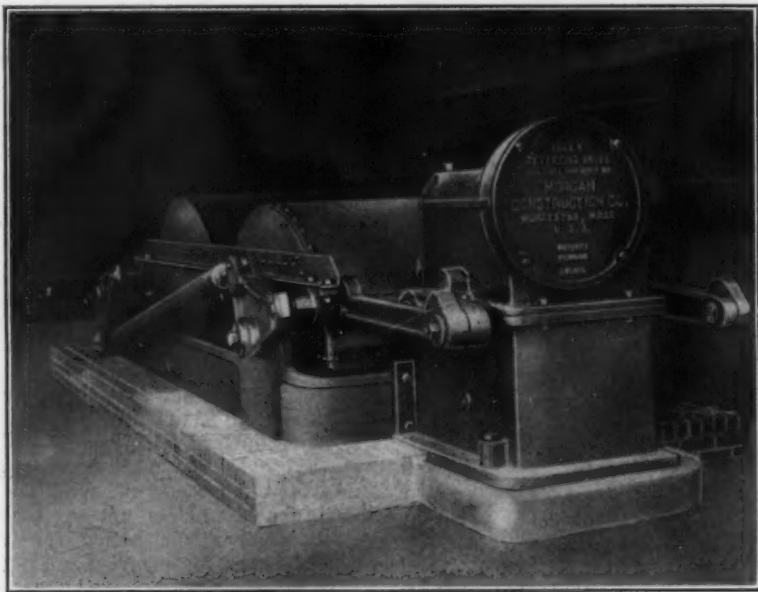


Fig. 1—Original Installation of the Isley Reversing Valve, Operating with 30-Ton Open-Hearth Furnace

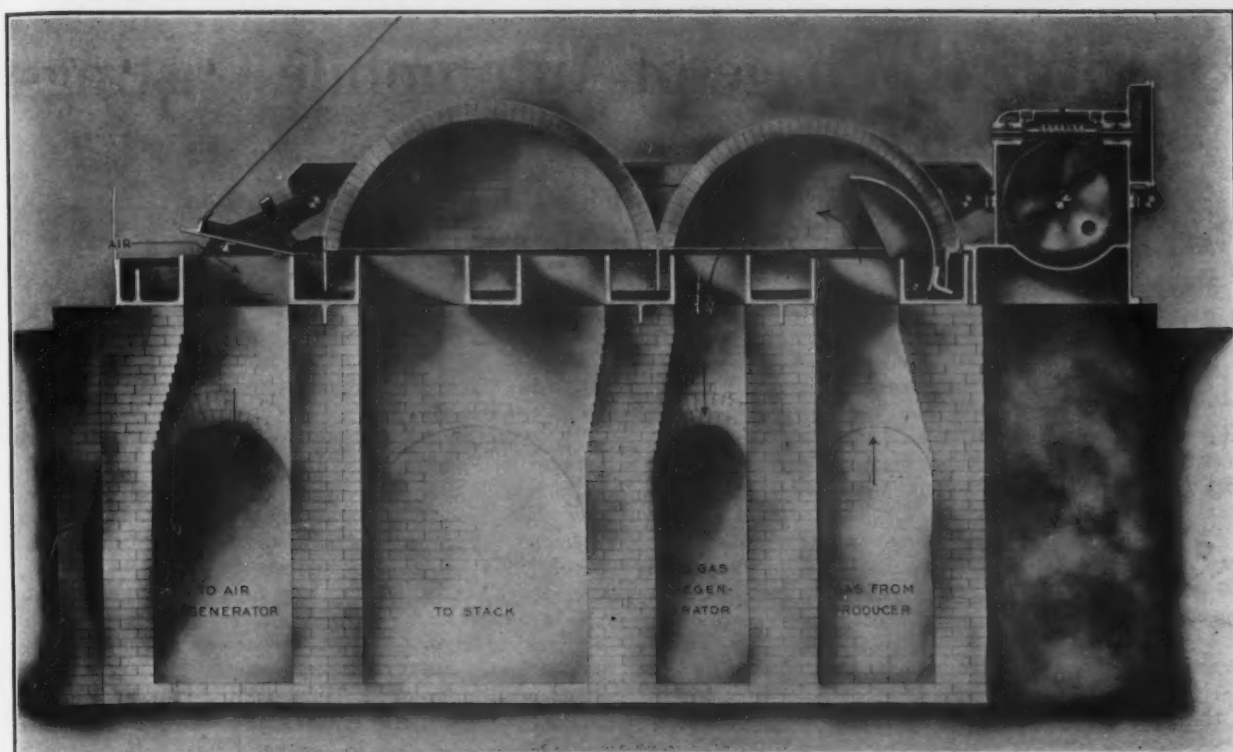


Fig. 2—Vertical Section through Isley Valve and Underground Flues with Valve in Ingoing Position. In reversing, the brick-lined hoods are raised far enough to permit the steel plates making their water seals to clear the water troughs; the structure is then moved to the left to the next set of water troughs (those which are not occupied, in the view shown). Meanwhile the steel cover over the passage carrying gas from the producer is closed automatically, preventing escape of gas on breaking of the water seal. This reversal closes the producer passage and opens both the gas regenerator and air regenerator to the stack, the suction of which then serves to pull the products of combustion through the furnace ports and the two regenerators and thence up the stack and out to the air above

Regulation of gas passing to the regenerator is effected by the control wheel mounted on the crank shaft of the reduction unit. Adjustable contact fingers are provided which act upon the control wheel and fix the degree of opening of the inlet port cover. The cranks can act only so far as the controlling fingers will permit and the restrained motion is transmitted through the connecting rods and the hood structure, which in turn controls the lift of the cover.

The hood structure with its brick linings is counter-

balanced by a unique set of compression springs (contained within the cylinder connecting the two bell cranks, at the left in Fig. 1), acting through the bell cranks, which are mounted on the base and guide the movement of the hood structure. Air and gas regulating stands located on the furnace floor serve as a convenient means for the furnace operator to control the ingoing air and gas. A master control switch is also

(Concluded on page 1610)

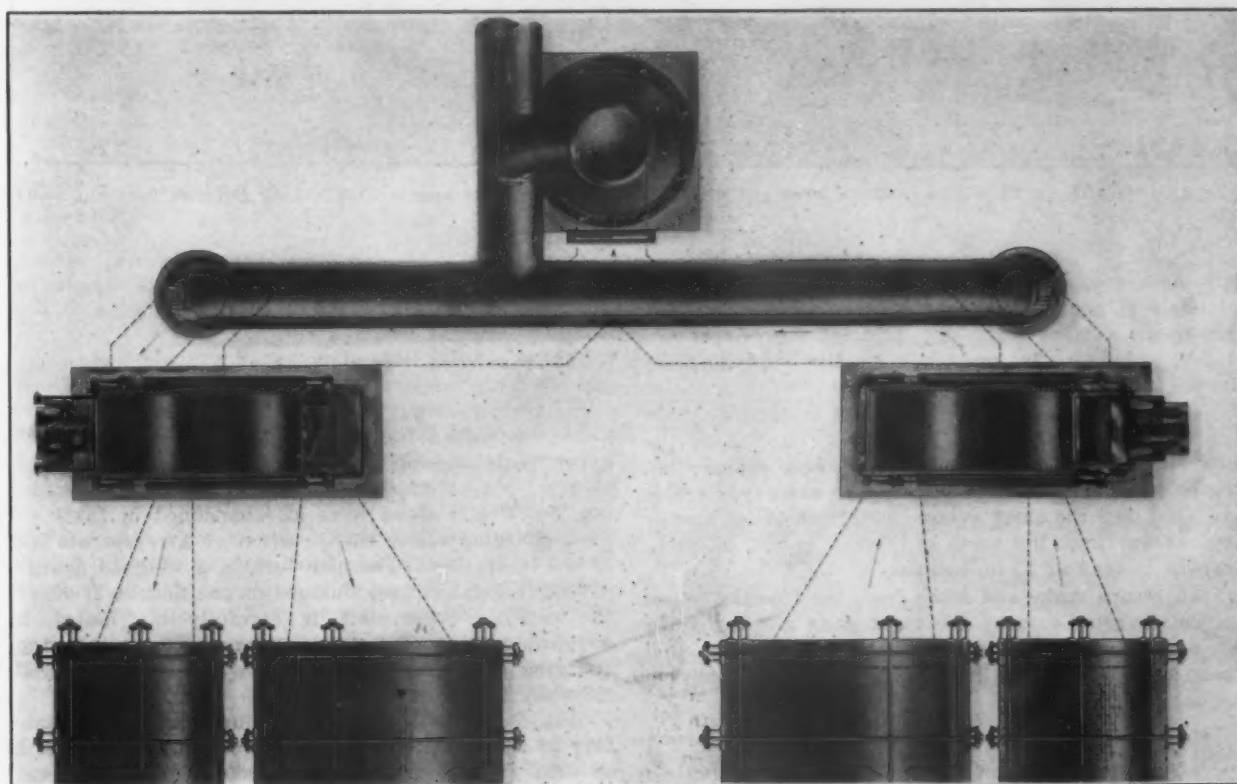


Fig. 3—General Arrangement of a Pair of Isley Reversing Valves, in Their Relation to Regenerators and Stack of Open-Hearth Furnace

Quantity Tonnage of Automobile Castings

Charging and Pouring Methods of Wilson Foundry & Machine Co., Pontiac, Mich.—Bull Ladles Used for Direct Pouring Into Molds

BY HENRY M. LANE*

ENTERING tracks for supply of raw materials are so laid out as to bring the iron in above the general foundry floor level. The scales are of the Howe suspension type, with all levers and knife edges protected by a small hood or housing overhead, while the weighing platform itself is suspended on four pendant rods.

The two cupolas in old foundry section have 72-in. and 84-in. diameter shells, and are lined to 36-in. and 66-in. diameter respectively. They are used for the special mixes, and the iron for these mixes is piled in this part of the yard. This includes thin steel scrap, most of which is tumbled and used as "medicine" in the ladles. Cylinder scrap and short steel rails cut to 12-in. lengths for economical melting in the small

The cars then proceed across the various scales and obtain the different ingredients necessary for the completed charge.

A general view of the new melting unit with its five cupolas and three elevators is shown in Fig. 1, one of the cupola stacks being behind the elevator at the left. The car at the right is standing over the coke bins, and the bin in the foreground is used for limestone. In front of the melting unit can be seen a dump truck pulling a dump cart or wagon. These dump carts are used for handling sand about the plant, for handling castings through the gangway to the cleaning room, and for many other purposes.

Under ordinary circumstances all metal charges are weighed up complete in the yard, and pass to the

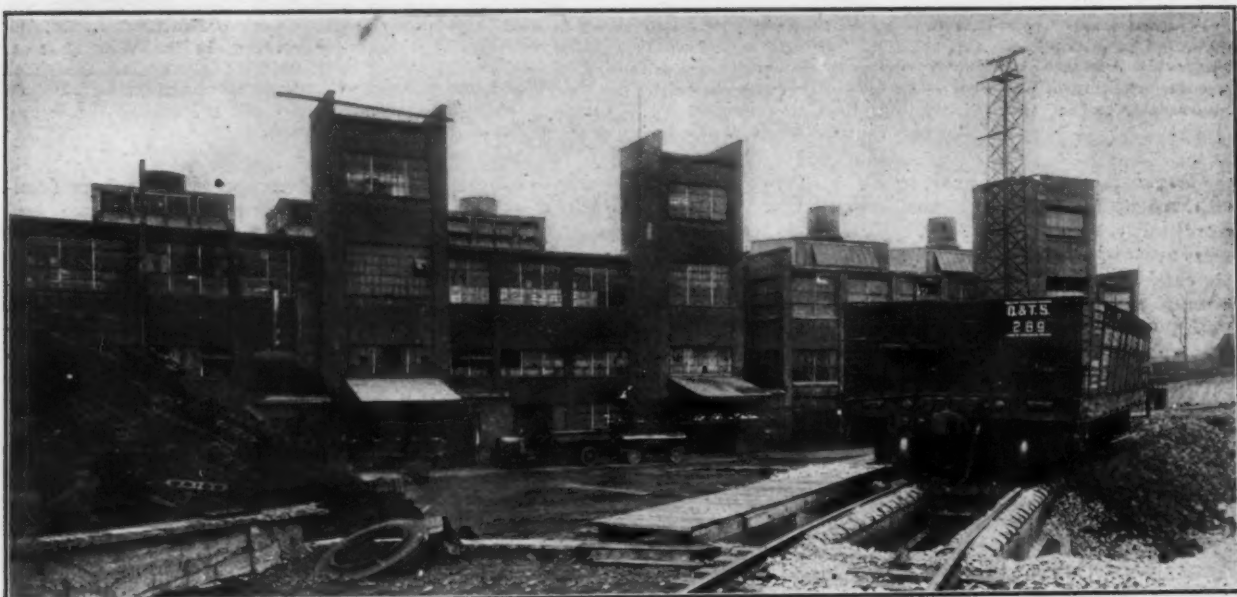


Fig. 1—New Melting Unit, with Five Cupolas and Three Elevators. The car stands over a coke bin, the lime bin being in the foreground

cupolas are used also, as well as the various grades of pig iron necessary. As the charging cars proceed across the various scales the different ingredients are added, and then they are ready for the charging platform.

The same general charging scheme is carried out in connection with the large 96-in. shell cupolas of the new foundry, the make-up yards for these charges being in another part of the plant. The same type scales are used, and the same general arrangement of charging, except that the steel rail scrap is cut to 30-in. lengths instead of 12-in. lengths.

All return sprue and scrap from the foundry is put on the charging cars by the night gang and is divided as nearly evenly as possible among the cars, and these units constitute the first of the scrap addition.

charging platform ready for the cupola. On the charging floor are held a series of charging cars with the complete charges weighed out.

These cupolas were all equipped with regular charging machines when they were put in, but it was soon found that these did not give an accurate enough mix. Then the Wilson foundry carried on a long series of experiments costing several thousand dollars trying to develop a satisfactory method of mechanical charging, but finally these were all abandoned in favor of hand charging under the direction of a representative of the laboratory. The men fork in a weighed charge of coke which has been dumped on the floor in front of the cupola. After this is carefully distributed, a weighed amount of limestone is added, and then the charging car containing the metal is brought up and carefully distributed.

Fig. 2 shows the entire charging floor, with a battery of three cupolas in the foreground. This floor is of steel plate construction of 1000-lb. per sq. ft. capacity. The charges consist of 3500 lb. Each of the larger cupolas has a capacity of 17 tons per hour.

*Industrial engineer, Detroit. The article is taken from a paper "Improved Foundry Practice: Quantity Production of Automobile Castings," read by Mr. Lane before the National Foundry Association. Other portions of the paper have been published at page 745, March 15; page 1037, April 12 and page 1173, April 26.

Attention is called to the blast pipes overhead for delivering cold air in front of the cupola doors, to make charging easier in hot weather.

Blast for the cupolas is furnished by positive pressure blowers. The company has carried on extensive

in Fig. 3. A 3-ton receiving ladle with skimming spout is placed in front of the cupola, and this pours directly into a 1000-lb. bull ladle on the monorail. These 1000-lb. bull ladles hang on a monorail scale, which reads on the dial shown at the left, so that the operator in



Fig. 2—General View of Entire Charging Floor, Showing Overhead Blast Pipes for Cooling the Men in Hot Weather

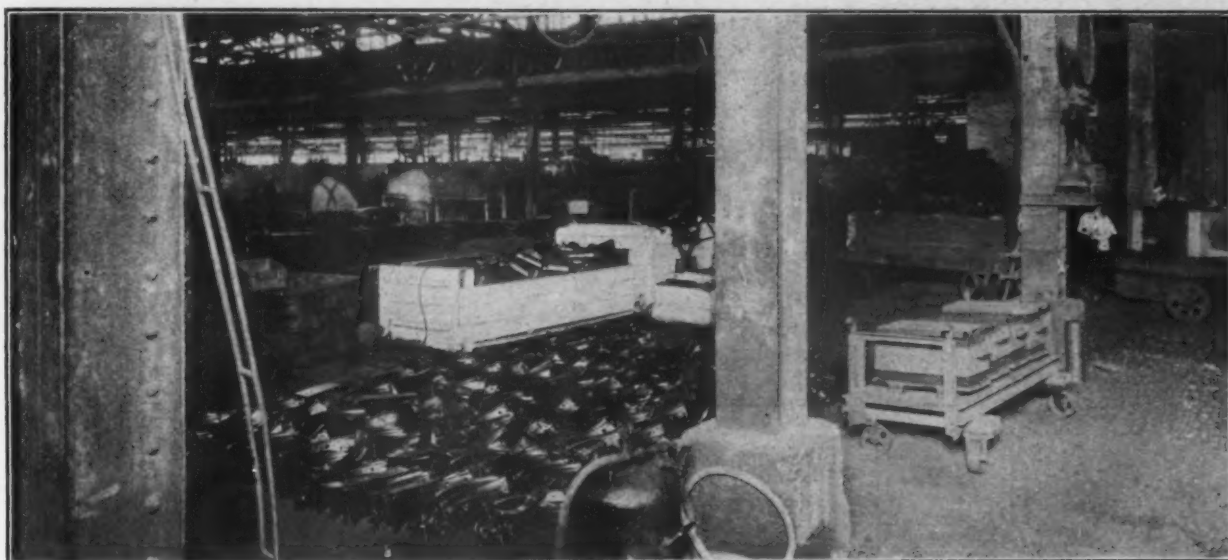


Fig. 4—General View of "Medicine" Floor, Showing Scrap which Is Added to Change Slightly the Composition of the Metal

experiments with fan and centrifugal blowers, but have found that, to produce high-grade iron with a minimum of loss, it is necessary to have a dependable uniform blast pressure. The blowers are arranged in such a way that by operating suitable gates any cupola can be blown with any one of two or more blowers, so that there is no danger of a shutdown from the breaking down of any given blower. The practice is to use 9500 cu. ft. of air per minute for each of the larger cupolas, and this volume is accurately determined by means of a Clarke volume blast meter.

The general arrangement for tapping iron is shown

charge of the receiving ladle can put a predetermined amount of metal into each bull ladle.

Careful study has been made of the number of pounds of metal required to pour a given number of castings of a certain kind, and each ladle is filled to take care of the castings it is to pour. A designating number is then hung on the ladle, which indicates not only the composition of the metal it contains, but the destination, so that as it is pushed through the foundry, everyone makes room for it, and sees that it arrives at its destination in the least possible time. This arrangement also does away with the possibility of get-

ting the wrong kind of iron into a given mold. It will be realized that this is particularly necessary when we consider that there are five cupolas in a line at the end of the shop, several of which are in blast at a time, and usually each cupola is melting a slightly different mix.

Any mixes requiring a considerable tonnage are made up on the charging floor, and the molten metal

a standard 1-in. square bar, 14 in. long, which is broken on centers 12 in. apart, and when tension tests are necessary, the bars for this are turned from the ends of the broken bar.

Another bar is cast 12 in. long in a metal yoke. The ends of this bar are chilled, and by splitting the end the depth of the chill can readily be seen. This physical test gives a quick check on the metal before

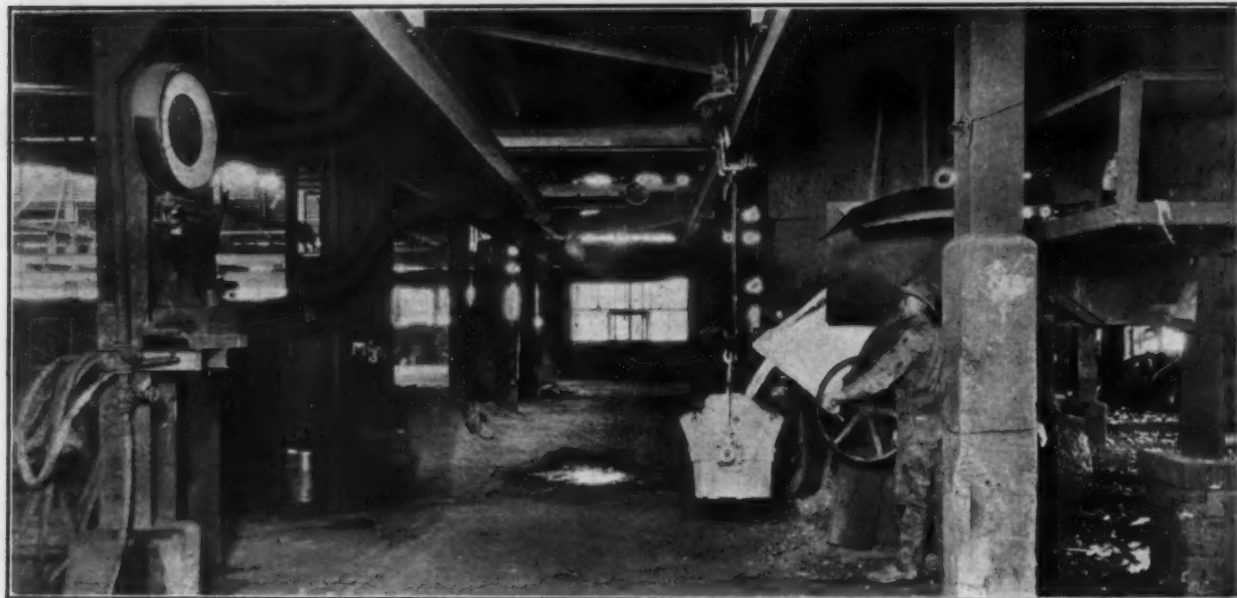


Fig. 3 (Above)—General Arrangement for Tapping Iron

Fig. 5 (Below)—Transmission Mold Being Filled Direct from a 1000-Lb. Bull Ladle



that comes down is of the proper composition, but there are a number of castings that require a slight variation from the standard mix, and to take care of this, additions are made to the ladle. A general view of the medicine floor is given in Fig. 4, which shows a lot of tumbled steel scrap in the foreground which has been accurately weighed into small charges ready for addition to the ladle. In the background can be seen a number of soft iron castings used for temperature control, and beside them the scales for weighing out charges, and also for weighing out the necessary additions of ferroalloys.

At the right is a small cart carrying several molds for test bars. It is the practice of this plant to use

chemical analysis has been made. This bar also gives the shrinkage, and these two factors enable the operators to tell much of their mixtures before analysis has been completed.

Many of the castings are poured direct from the bull ladles filled at the cupola. Fig. 5 shows such a ladle pouring transmissions. The 1000-lb. ladle is held on an air hoist upon a traveling crane as shown. The ladle is brought from the cupola to the crane on a trolley, and is transferred to the air hoist by means of a two-way or sister-hook. Of course some of the work is better poured with hand ladles, in which case metal is taken to the floor in the bull ladle, and then transferred to the hand ladles.

Machine for Slotting Locomotive Frames

A locomotive frame slotting machine representing in some particulars a departure from the conventional design has been brought out by the Niles-Bement-Pond Co., 111 Broadway, New York. The principal departure is in the method employed for the main drive of each unit.

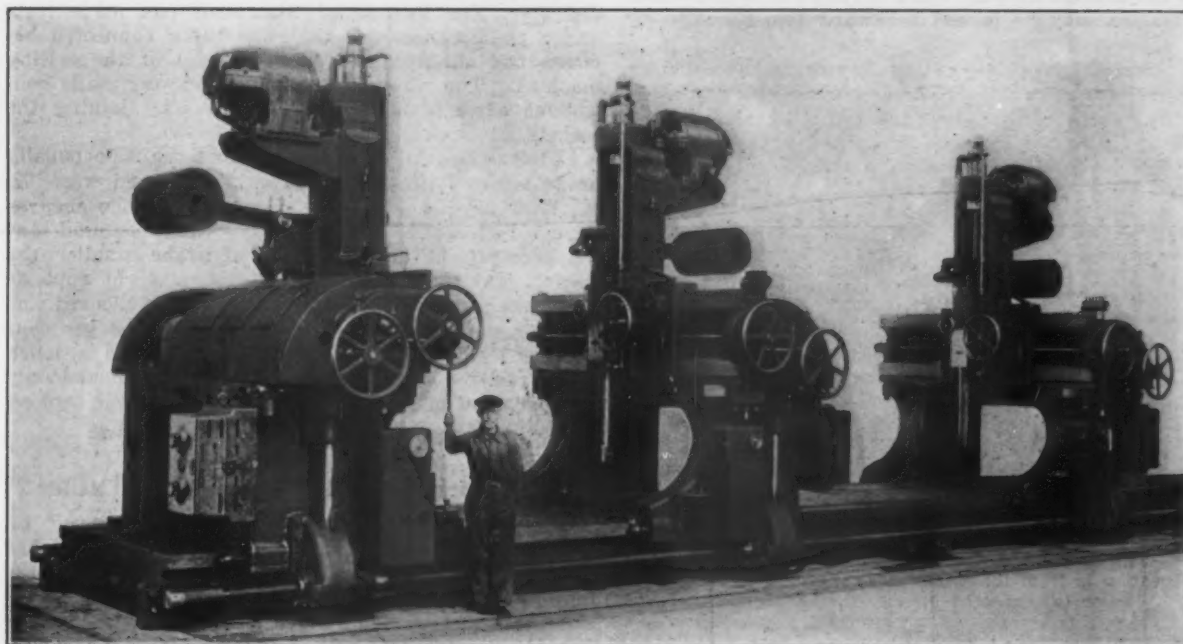
Formerly reversing motion was effected by means of a crank and connecting rod or through reversing pulleys and belts for transmitting power to a rack on the cutter bar. The new design utilizes a reversing motor mounted on each head as shown, which, driving through a pair of gears rotates a vertical screw that directly engages the cutter bar.

The motors are 20 hp., with a 4 to 1 speed range. The cutting and return speeds are controlled independently and any combination between them can be obtained within the speed range of the motor. The return speed range limits are higher than those assigned

machine illustrated being 60 ft. long. Each head is self-contained and comprises two principal members, the yoke and the cross-rail. The latter can be swiveled in the horizontal plane for cutting tapers and angles. The openings in the yoke are 61 in. wide and 41 in. high which accommodates six 6 in. frames or four 8-in. frames set on the bed for simultaneous slotting. The extension tool bar is cylindrical in form, has a relief socket on tool apron and has its upper bearing in the cutter bar. The tool bar is revolved by a worm wheel gearing and hand wheels for setting tools or for cutting fillets.

Two British Premiers Were Steel Men

Arthur Bonar Law, retiring British premier, and Stanley Baldwin, chancellor of the exchequer and succeeding premier, were both reared in the steel business. The former, a native of New Brunswick, Canada, after graduation from high school in Glasgow, became a



Locomotive Frame Slotter With Reversing Motor Mounted on Each Head. The motor, driving through gears, rotates a vertical screw that engages the cutter bar. The feed arrangements are a feature. Each head has its own motor for feeding and traversing it along the bed, and the saddle along the cross rail

to cutting. Two dials on the contactor panel are connected with the rheostats which govern these two speed functions. The desired cutting speed is set on one, the return speed on the other. The motor is reversed by automatic contactors governed by a pilot switch which is actuated by the tripping of adjustable dogs on the cutter bar. The dogs are set by hand at locations that give the desired length and location of stroke. The maximum stroke is 38 in.

The feed arrangements employed are also a feature. Each head has its own motor for feeding and traversing it along the bed, and the saddle along the cross-rail. This motor through gears and shafts actuates the nuts on fixed screws along each side of the bed for the longitudinal feed and traverse of head. The same motor through another gear train feeds and traverses the saddle along the cross-rail. The operation of both feed and traverse is electrical. A dial set at a predetermined point permits the feed motor to make one or more revolutions intermittently by means of which the desired feed is obtained. The throwing of a switch permits the motor to run continuously giving fast traverse of either head or saddle as desired.

Slotting at an angle too steep to be covered by the swiveling feature of the cross-rails is necessary at the ends of some locomotive frames, and this requirement is met by combining long and cross-feeds for simultaneous action. By change gears and swing arms, combinations between these feeds may be effected to slot any angle up to 45 deg.

The machines are available with from one to three heads and in various lengths of bed, the bed of the

member of the firm of William Kidston & Sons, iron merchants, Glasgow, and of William Jacks & Co., also engaged in the iron business in that city. He was at one time chairman of the Glasgow Iron Trade Association. Premier Baldwin was born to a wealthy mining family and obtained his education not only in the family mines and mills, but at Harrow and Trinity College, Cambridge. He was affiliated with Baldwins, Ltd., Swansea, Wales. Following graduation he sought his fortunes in steel, which continued his major interest until 1908, when he was elected to the House of Commons.

A merger of the properties of the Dayton Malleable Iron Co., with plants at Dayton, and Ironton, Ohio, and the Pratt & Letchworth Co., Buffalo, is now being negotiated. An increase in capitalization of \$4,000,000 has been arranged by the Dayton Malleable Iron Co. The merger is expected to become effective June 30. John C. Haswell is president of the Dayton Malleable Iron Co., and John H. Bradley of the Pratt & Letchworth Co.

Sales of mechanical stokers in April showed a marked advance over the figures for February and March. According to the Bureau of the Census, 15 establishments reported sales of 167 stokers, rated altogether in 85,339 hp. against 120 in March, aggregating 68,955 hp., and 129 in February for 66,619 hp. The month was slightly better in horsepower rating than January. January sales covered 145 stokers, rated at 83,270 hp.

New Self-Feeding Bucket Loader

A new self-feeding bucket loader mounted on a standard Fordson tractor as illustrated has been placed on the market by the N. P. Nelson Iron Works, Inc., 212 Fortieth Street, Brooklyn, N. Y.

The equipment is for loading sand, soft coal and other materials into wagons and trucks from banks or piles not adjacent to each other. The capacity is 40 yds. per hr. of material that a man can shovel without the use of a pick and the propelling speed of the tractor is 12 miles per hr.

In operating the machine the operator stands on a platform located at the side as shown. Controls are within easy reach and the position on the platform permits of unobstructed view of the digging and loading operation, an arrangement intended to permit of keeping the performance of the loader up to its rated capacity.

The elevator is direct connected to the engine and with the toothed digging spirals, runs full speed while the tractor may be inched backward into the pile of



Self-Feeding Bucket Loader Mounted on a Tractor. Operation is from the platform at the side. The elevator is connected directly to the engine

material being loaded. The spirals are said to level a 6 ft. cut, and material once started in motion keeps moving continuously until picked up by the elevator buckets. An overload release is provided to give the operator ample warning of boulders or undiggable material. The tractor is equipped with a governor to control fuel consumption to actual requirements. A power take-off is available for use in operating other machinery, and the loader attachment may be conveniently removed and the tractor used for other purposes. Tractors now in service can have the loader mechanism mounted on them. A swivel spout, attached to the loader as shown, permits of discharging the sand or other material sideways into the truck if necessary. The clearance under this chute is 8½ ft. The elevator frame is of truss design and elevator buckets, chains, sprockets, and other components are of the company's standard construction.

Thermal Stresses in Steel Car Wheels

An investigation of stresses induced in steel car wheels from heating the tread has been carried out at the Bureau of Standards in a manner approximating severe service conditions. It is said by experienced railway men that the tread of the wheel becomes heated to a dull red from the application of brake shoes on descending long mountainous grades. A large number of rolled, forged and cast steel wheels, both new and worn, were tested, the wheels being mounted on a hollow water cooled axle and the treads heated by passing an electric current through a soft steel resistor which encircled the wheels.

Observations were made every 10 min. of the temperatures and deformations throughout the wheel. In the regular tests the maximum tread temperatures reached 716 deg. Fahr. in 90 min. and in three special

tests the tread was heated to about 930 deg. in 150 min. Although the test was more severe than actual service conditions, none of the wheels developed cracked plates in any of the tests.

The results of the investigation show the manufacturers how the wheels are deformed from high tread temperature, giving the magnitude and distribution of stresses throughout the wheels. The manufacturers will be able to use these new data to advantage in considering the question of proposed changes of design and manufacturing practice. They are contained in technological paper No. 235 of the Bureau of Standards, which may be obtained from the Superintendent of Documents, Government Printing Office, Washington.

Strength of Wire Rope Over Sheaves

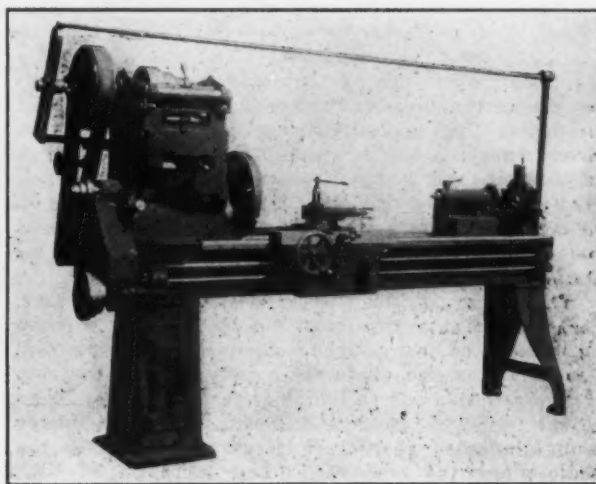
Wire rope in use is generally weakest at the points where it passes over sheaves, especially those of small diameter. The Bureau of Standards has made tests under these conditions, the rope being connected between two sheaves, one on each head of the testing machine. The rope was socketed and was made continuous after placing on the sheaves by joining the sockets.

Under the load it was found that the rope usually broke where it left the sheave. Ropes used were ¾, ¾, 1 in. and 1¼ in. in diameter, and the sheaves were 10, 14 and 18 in. in diameter. It was found that the strength of the rope was less the smaller the sheave. Taking the strength of the straight rope as unity, the strength of the ¾-in. rope over sheaves was 87.4 per cent for the 10-in. sheave and 95.3 per cent for the 18-in. sheave. The larger ropes had a much lower relative strength, as the 1¼-in. rope had only 75.8 per cent on the 10-in. sheave and 84.7 per cent on the 18-in. sheave.

Motor Drive for Cone Headstock Lathes

A motor drive arrangement for its "Standard" 14, 16, 18 and 20-in. lathes, which may be readily attached to machines in service, has been brought out by the John Steptoe Co., Cincinnati.

In this arrangement, which is shown in the illustration, the countershaft unit is bolted right over the cone



Motor Drive Arrangement for Lathe. The countershaft unit is mounted directly over the cone pulley

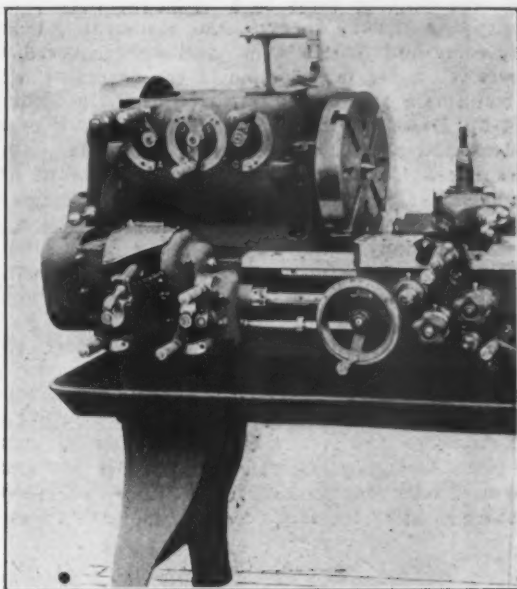
pulley of the lathe, and it is provided with a clutch gear so that the motor can be engaged and disengaged instantly. The cone pulley on the countershaft can be moved away from the lathe spindle for tightening the belt running from the countershaft to the headstock cone pulley. An idler pulley is provided to keep at the proper tension the belt from the motor to the countershaft.

The motor is mounted in back of the lathe in line with the bed and is placed in a position intended to reduce vibration to a minimum. A constant speed, 1100 to 1200 r.p.m., motor is recommended.

Improved Geared Head for "American" Lathe

The automatically oiled, 12-speed geared head feature of the lathes of the American Tool Works Co., Cincinnati, is now available for machines up to and including the 36-in. medium pattern machine.

The mechanical spindle speeds are in geometrical progression. All gears in the head are of manganese steel, heat treated. Only three shafts are used in the head, which permits gear centers to be located farther apart and gears of larger diameter to be used. The entire mechanism operates in a bath of oil. The 24-in. heavy-pattern machine will, it is said, transmit 20 hp. On the belt-driven head of the same size, power is delivered to a 16-in. pulley by a 6-in. double belt.



Automatically Oiled Geared Head Provided for "American" Lathes. Only three shafts are used in the head. The gear tooth clutch employed and the lubrication system are features

The arrangement of the driving pulley is a feature. To eliminate belt pull from the driving shaft the pulley is bronze bushed and mounted on a long steel sleeve of large diameter, which takes the pull. The sleeve is also bronze bushed and forms the journal for the driving shaft to which the pulley is keyed. Lubrication is by an automatic oiling system.

A gear clutch is used in place of a jaw clutch, which is said to be an advantage both in ease of engagement and durability. The new clutch is made up of an external and internal gear of the same pitch diameter and number of teeth. The teeth are generated on a Fellows gear shaper and are rounded on the ends, to facilitate engagement. Both members of the clutch are of alloy steel, heat treated and hardened.

In the automatic oiling system, oil is circulated by a geared pump accessibly located inside of the head, from a reservoir in the bottom to a filtering and distributing tank in the head cover, from which the bearings are lubricated. After filtering the oil flows to the various bearings through pipes. The pump supplies oil to the filter faster than the latter can take care of it, and in larger quantities than the bearings will consume. The surplus overflows to the gear teeth.

The oil first flows into a settling tank in the lower head casting and as it accumulates it overflows into a straining compartment, where it passes through a strainer into the pumping reservoir. From this point it is lifted by the pump into the filtering tank in the head cover, where it is filtered through a felt pad. This distributing chamber is divided into compartments, each one of which holds a supply of oil for one particular bearing. A gage glass in the supply line from the straining compartment to the filtering tank indicates to the operator whether the oil pump is working properly.

New Centerless Grinder

A centerless grinder, known as the No. 4B, designed for the accurate grinding of straight cylindrical parts up to and including 4 in. in diameter on a production basis, has been placed on the market by the Detroit Machine Tool Co., Detroit.

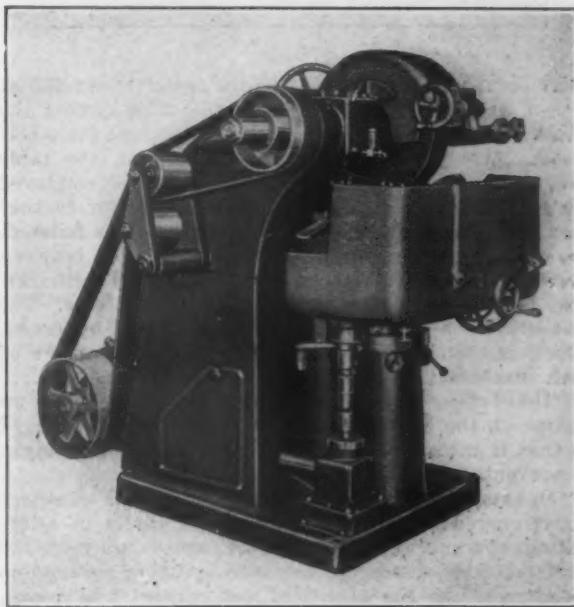
The lower or feed wheel is directly beneath the grinding wheel so that the work being ground rests upon it and is rotated by it, as in the No. 4 machine described in THE IRON AGE of March 31, 1921. The feed wheel is double the width of the grinding wheel so that the work will rotate at the proper speed as it comes in contact with the grinding wheel.

The lower wheel is mounted on a vertical column on which it may be pivoted, and its angle with the grinding wheel varied up to 10 deg., thus permitting changes in the traverse or feed of the work through the machine. The diameter to which the work is to be ground is controlled by a sensitive adjustment in the lower unit column, and minute adjustments may be made through a handwheel and dial provided.

Sliding gears in the change gear box provide two grinding and two driving wheel speeds which are 1080 and 1176 r.p.m. and 33 and 44 r.p.m. respectively. The grinding spindle driving pulley on the lower shaft is 14 in. in diameter by 5½ in. face. Other spindle speeds may be obtained by the use of a special pulley.

The feed wheel is driven direct from the change gear box through a set of bevel gears and the vertical universal drive shown in the accompanying illustration of the machine. The direct drive is claimed to overcome tendency toward unsteady rotation of the lower wheel due to belt slippage. A worm and worm wheel drive on the lower spindle, with arrangement to compensate for wear, is intended to prevent backlash in the feed wheel.

The grinding wheel drive is by belt from the change gear box pulley over a ball bearing idler to



Centerless Grinder for Straight Cylindrical Parts Up to and Including 4 In. in Diameter. A new feature is the method of mounting the spindle pulley on the spindle

the grinding spindle pulley. A feature of the grinding wheel drive is the method of mounting the spindle pulley. The pulley is mounted on ball bearings on a stud which is supported at the outside end by a cast iron bracket. The inner hub face of the pulley carries a plate with a spline bore which engages with the splined end of the spindle. This is intended to form a flexible coupling which transmits only a rotary motion to the spindle, and eliminates wearing effect of belt pull on the spindle bearing.

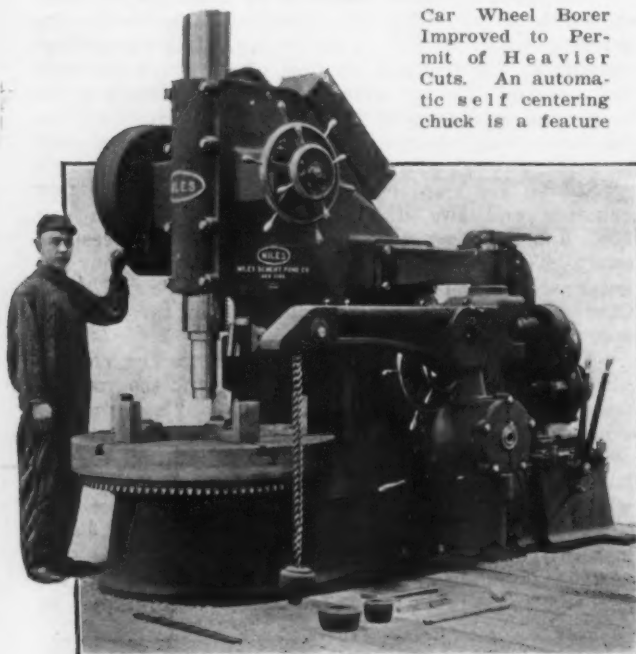
Diamond devices for truing the wheels are integral parts of the machine. The floor space occupied is 54x69 in. and the weight approximately 5000 lb.

Car Wheel Borer with New Features

A new 48-in. car wheel borer with features intended to permit of increased production and safer operation has been placed on the market by the Niles-Bement-Pond Co., 111 Broadway, New York.

The frame, which is a one-piece casting, has been made heavier to provide greater rigidity and permit of taking heavier cuts. The design of the frame has been changed to give greater support to the hub-facing bar, this being also intended to contribute toward making heavier cuts possible.

The automatic self-centering chuck is a feature. After the wheel to be bored has been swung into



Car Wheel Borer Improved to Permit of Heavier Cuts. An automatic self centering chuck is a feature

place on the table by the crane the motor is started at a slow speed. A mechanism in the table causes the chuck jaws to move inward until they engage the wheel tread. When the work is firmly chucked, the table commences to rotate and the driving force employed when the cutting operation begins serves to further lock the wheel in the jaws. When the work is finished, the motor is reversed and the relative motion between driving gear and table serves to loosen and withdraw the jaws toward the periphery of the table. The motor is then stopped and wheel removed by crane, which is motor-driven and part of the equipment of each machine.

The boring bar counterweight operates down an incline on the back of machine frame and is arranged so that if the support chain breaks, the counterweight is prevented from falling.

Dynamic braking can be taken advantage of where direct current is available. For either direct or alternating current reversing motors are employed; the different table speeds are obtained by using a variable-speed motor in the case of direct current and a constant-speed slip-ring motor operating through a speed change box where alternating current is used. No clutches are used in either case. A belt-driven machine is also available although electric drive is recommended.

A farewell luncheon was given by American Engineers on May 18 to Dr. Emmanuel de Margerie, an international authority on geology who, as exchange professor to the United States, has finished a year of lecturing at several American universities. The luncheon was arranged by the presidents and members of the boards of civil, mining and metallurgical, mechanical and electrical engineering societies, and was held at the Harvard Club, New York. Dr. Albert R. Ledoux, past president of the American Institute of Mining and Metallurgical Engineers presided.

New Building of Wagner & Co. Erected at Lima, Peru

August N. Wiese, one of the proprietors of the importing and machinery firm of Emilio F. Wagner & Co., Lima, Peru, has completed a thoroughly modern five-story building which stands out against Lima's skyline as its first modern city structure. The work was done by the Fred T. Ley Co., New York. Construction was directed by Ira A. Lamont, superintending engineer for the Ley company.

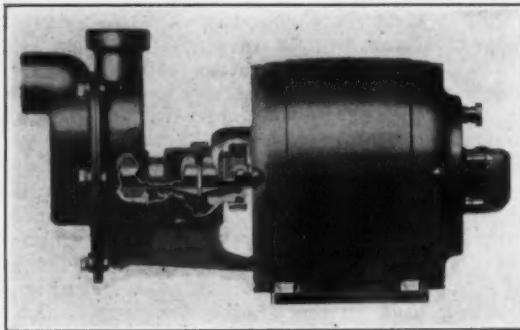
Three hundred tons of Carnegie steel have been used in the reinforcement of the concrete in which 7000 barrels of cement were used. The building occupies ground area of about 16,000 sq. ft. The rear of the building is equipped with a 5-ton crane for handling machinery and heavy materials from trucks in the street and shifting these to a hydraulic lift operated to reach the storage room in the basement. A large strong room built with 3½ in. steel walls covered with concrete is located in a section of the basement, which also contains a 120-ft. concrete well, 6 ft. in diameter. An 80-hp. Diesel engine will provide power for pumps, elevators and also to run electric generators. Emilio F. Wagner & Co. will occupy the main floor and basement exclusively. The same hygienic conveniences and modern improvements have been installed which one finds in the many buildings now being constructed in New York. Each of the upper floors is sub-divided into 15 office suites, each room of which opens onto the central corridor.

It is freely predicted that the era of 3-story adobe buildings in Lima's business section is past. Mr. Wiese's building has stimulated unusual interest in this kind of structure. Both the Fred T. Ley Co. and the Foundation Co. report that a number of owners have plans under consideration for similar structures. It seems likely that in the future Lima will pattern its buildings after the large North American cities.

Pump for Cutting Lubricant

A motor-driven centrifugal pump incorporating its ring-oiled packing gland feature, regarded as especially suitable for circulating cutting lubricants to machine tools is being marketed by the Arrow Pump Co., Buhl Building, Detroit.

The bearings of the pump are protected from contact with the liquid being pumped and are lubricated



Centrifugal Pump for Circulating Cutting Lubricant to Machine Tools. Ring oiling of bearings is a feature

by means of ring oilers. The impeller, the only working part of the pump, is of durable construction and a priming chamber is provided to permit the pump to retain its prime and work within its suction capacity above the level of supply without the use of mechanical prime retainers, such as foot or check valves.

The unit is of sufficient capacity to supply a group of machines from a central supply. No base is required and it may be assembled for floor or wall mounting. It is claimed that as both the motor and pump bearings are ring oiled from large oil wells, the unit may be located in isolated places without the need of frequent attention.

Economies Claimed for New Drill Jigs

Reduction of total drilling time and savings in the making and storing of jigs are claimed for the universal drill jigs illustrated, which are being placed on the market by the Cleveland Universal Jig Co., 2005 Oregon Avenue, Cleveland.

Two types are available, the jig designated as type A being primarily for use in place of the screw bush type jig. It is made up of a base with two columns in which there are two plungers holding a top plate, which is bored in line with the base to receive the drill bushings. The plungers operate up and down by means of racks and pinions, the pinion shaft being actuated by the handle. The latter locks in any position on the sector by pressing the handle latch, which pulls down a wedge, forcing a shoe to clamp the sector. The drill bushings can be made to conform to any shape of work, whether round or odd, since only straight up and down moves are required to use the jig.

In the type B jig, which is designed for use in place of the leg and box type jig, there are no clamps or

nango Valley. It is estimated iron production in the district is approximating 650,000 tons monthly.

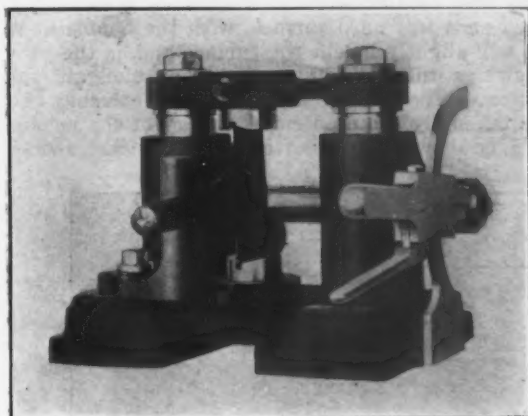
Puddling operations are still handicapped by lack of skilled labor. Pipe, merchant bar, light bar, skelp, plate, rod, wire and conduit mills are virtually at 100 per cent.

The Youngstown Sheet & Tube Co. prepared this week to start its No. 10 tube furnace, placing its 11 pipe mills in operation for the first time in many months.

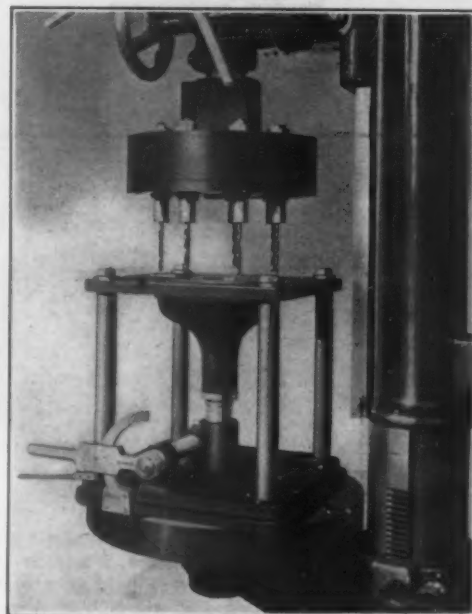
Engineering Society of Buffalo

At the annual election of officers of the Engineering Society of Buffalo held last week at the Hotel Statler, these officers were elected for the coming year: Karr Parker, president; W. L. Spalding, vice-president; N. L. Nussbaumer, secretary, and E. T. Mathewson, treasurer. Cecil Farrar was elected a director for one year and Frank Hubbard and Capt. George Norton, directors for two years.

Calvin W. Rice of New York, secretary of the Amer-



Savings in Drilling Time Are Claimed for the Universal Drill Jigs Shown. Type A, for use in place of the screw bush type jig, is shown at the left as used in drilling the king pin hole in a spindle. Type B, for use in the place of jigs of the leg and box type, is shown at the right as used in drilling the bolt holes in a bell casting.



screws to be tightened in order to hold the work. The device is made up of a square base to which four posts are fastened, as shown. The top plate mounted on the posts is bored to receive the drill bushings. The handle and rack and pinion movement used in the type A jig is employed here also, but instead of two plungers pulling down with the movement of the handle, there is one plunger, which pushes up and which is intended to hold the work rigidly against the top plate while drilling.

In loading the work is placed in the jig, the handle pulled down so the work is held rigidly between the bushings or against the top plate, and the handle latch pressed to hold the work in that position. To unload, the handle latch is pushed down, the handle raised and the work removed.

Unusual saving in drilling time is attributed to the few motions required to load and unload the jig, 2 sec. being said to be required for each. It is also claimed that because any number of different parts may be drilled in the jigs merely by changing the bushings in the one type and the top plate in the other, substantial savings in tool storage space and savings in the cost of making jigs are available.

Labor Shortage Curtails Operations

YOUNGSTOWN, May 22.—Shortage of mill labor is curtailing operations in the sheet and tin plate divisions of the steel industry. While independent schedules call for operation of 116 of the 117 sheet units in the Mahoning Valley, there are times when as many as 10 mills are idle because of inability to assemble the crews.

This week the Liberty tin plate works at Leavittsburg of the Trumbull Steel Co. resumed in part following a suspension of three months.

In the Youngstown district, 42 blast furnaces were scheduled this week for production, the highest number in three years. Of the total, 26 furnaces are in the Mahoning Valley, and 16 of 20 are pouring in the She-

ican Society of Mechanical Engineers, was the guest of honor at the annual dinner which preceded the election. Mr. Rice gave a talk on the relation of local engineering societies to the national body. Maj. R. W. Schroeder of Chicago, former chief test pilot of the United States army aviation section, also spoke. Over 200 members of the society attended.

Iron and Steel Exposition

Exhibitors have contracted for large blocks of space to display the latest developments in steel mill apparatus at the exposition to be held in the Auditorium in Buffalo, Sept. 24 to 28. The exposition will cover the fields of electrical, mechanical and power engineering, with special emphasis on the problems confronting operating engineers in maintaining at all times continuity of operation.

Shipments of steel-furniture stock goods in April amounted to \$1,520,286, as against \$1,709,206 in March and \$1,058,382 in April, 1922, according to figures received from 22 manufacturers by the Bureau of the Census, in cooperation with the National Association of Steel Furniture Manufacturers.

Union molders in the Cincinnati district are expected to make a demand for increased wages within the next few days, the matter now being under consideration by the unions.

NEW HARDNESS TESTER

Portable Instrument for Shop or Laboratory Use
—“Pendulum” Principle Incorporated—
Simplicity a Feature

A new instrument, known as the “pendulum” hardness tester, for testing substances ranging from lead to sapphire, but which is especially applicable to hardened steels, has been brought out in England by Edward G. Herbert, Ltd., Manchester.

Elimination of microscopic measurements and difficult readings are among the claims for the instrument, and, as it does not depend on impact, the readings are not affected by the mass or inertia of the specimen. Heavy loads are not used, and the test, it is said, may be applied to thin and fragile specimens without risk of breakage or defacement of finished surfaces. The device is portable and tests may be quickly made.



Fig. 1—“Pendulum” Hardness Tester Testing a Cutter Held in the Ball Vise

The general construction of the instrument may be noted from the illustrations, Figs. 1 and 2. A ruby or steel ball 1 mm. in diameter is held in a chuck in the center of the instrument, and six threaded weights are provided for adjusting the position of the center of gravity of the instrument to coincide with the center of the millimeter ball. Immediately above the ball is a graduated weight mounted on a screw. By raising or lowering this weight the center of gravity of the whole device can be brought to a predetermined distance above or below the center of the ball. The graduations on the weight show displacements of the center of gravity in hundredths of a millimeter. A curved tube and bubble, and a scale graduated from zero to 100 are mounted at the top of the instrument. The instrument is available in two weights, 2 kg. and 4 kg. respectively.

The center of gravity being at the center of the ball the instrument is in neutral equilibrium when supported by the ball on a hard level surface. It tends to remain in the position in which it is placed, whether upright or tilted at an angle. If the center of gravity is above the center of the ball the equilibrium may be unstable, in which case the instrument tends to “lie down.” If the center of gravity is below the center of the ball the equilibrium is stable. The instrument constitutes a “pendulum” oscillating about its central position, the time of oscillation being greater as the length of the “pendulum,” the distance between the center of gravity and the center of the ball, is less. For standard tests the length of the “pendulum” is 1/10 mm. (0.0039 in.), and the time of a swing on a very hard surface is 10 sec.

Two Independent Tests Available

The instrument provides two independent tests of hardness, which depend on different principles and measure different kinds of hardness. Each test has a scale of hardness numbers from 0 to 100, but the hard-

ness numbers of a given substance are not the same on the two scales. Generally substances are placed by the two tests in the same order of hardness, but in some cases the specimen which is shown harder by one test may be softer according to the other.

For most purposes the “time tests” are recommended, being easily applied, uniform in result and not requiring accurate leveling or extreme smoothness of surface. “Scale tests” on hard materials require accurate leveling of the surface tested and freedom from scratches and other imperfections in the surface. The time test is regarded as a general test of hardness, and the scale test in conjunction with the time test, as a further means of comparing the physical properties of materials.

If the instrument is tilted to the right until the bubble comes to 0 on the scale, and is placed on a hard, level surface and released, it will swing pendulum fashion, the oscillations gradually decreasing in amplitude owing to the expenditure of energy at the point of contact between the ball and the hard surface. The amplitude of the oscillations is shown by the bubble on the scale. On plate glass the bubble travels from 0 to 97 in the first oscillation.

Placed on a less hard surface, with the bubble at 0, the ball will slightly indent the surface and as the pendulum swings the ball will roll out or elongate the indentation. The energy absorbed in displacing the metal is taken from the potential energy of the pendulum, and is shown by a shortening of its first swing.

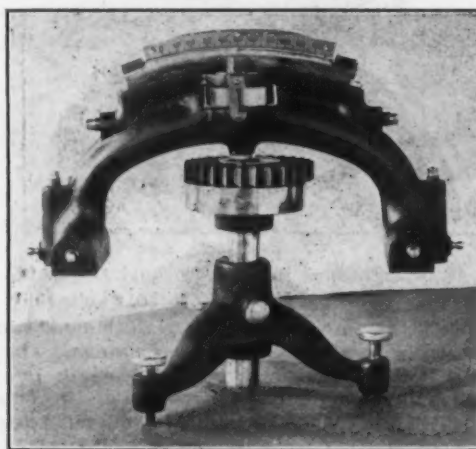


Fig. 2—Flat Specimens are Supported on the Leveling Table While Being Tested. The leveling table and ball vise are part of the standard equipment

The position of the bubble on the scale at the end of the first swing shows the work done by the ball on the specimen and measures its hardness. In a very soft specimen the indentation will be relatively deep and the pendulum will come to rest after a very short swing, or, as in the case of lead, will not swing, but remain at 0.

In practice the pendulum is placed gently on the specimen in an upright position and tilted to 0 and released. The weight of the instrument causes the ball to indent the surface, and the effect of tilting to 0 is to elongate the indentation. When the pendulum is released the ball rolls back along the groove, pushing a little wave of material in front of it until its energy is exhausted and it stops, the position of the bubble indicating the “scale hardness” of the specimen. Typical scale test readings, using a 1 mm. ball, are:

Scale Hardness Test Readings

| | |
|---------------------------|----|
| Glass | 97 |
| Very hard carbon steel | 93 |
| Hard carbon steel | 88 |
| Tempered high-speed steel | 75 |
| Annealed high-speed steel | 54 |
| Annealed carbon steel | 41 |
| Roller brass | 14 |
| Cast brass (soft) | 4 |
| Lead | 0 |

Time Tests Recommended for Most Purposes

The time period of oscillation of the pendulum is said to be a very reliable measure of hardness, and in this the time in seconds taken in making 10 swings on

any substance is the "time hardness number." The "pendulum" is placed gently on the specimen with the bubble at or near 50 and is caused to oscillate through a small arc, the time being taken with a stop watch. It is said that in most cases it is sufficient to time a single or double swing, but on soft substances which produce rapid oscillations, and for very accurate readings, the time for 10 swings is taken.

The time of oscillation is said to be, within limits, independent of the amplitude, and the limit is generally set by the instrument. If it is caused to make a long swing on a soft material it will merely settle down at

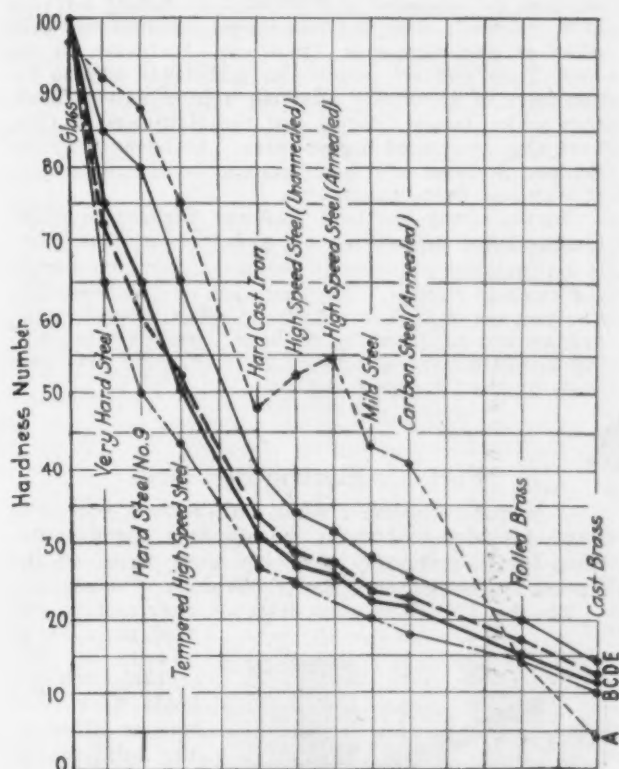


Fig. 3.—Diagram Showing Results Obtained from a Series of Metals Under Five Conditions. Curve *A* is a scale test with a 4-kg. pendulum using a steel ball. The other curves are of time tests, *B* and *C* using a 4-kg. instrument with a ruby and steel ball respectively, and curves *D* and *E* using a 2-kg. pendulum with a ruby and steel ball respectively.

the end of the swing in a new position, about which it will oscillate in short, rapid swings, characteristic of that material. Typical time-test readings, using a 1 mm. steel ball, are:

| <i>Time Test Readings</i> | |
|--------------------------------|-----|
| Glass | 100 |
| Very hard carbon steel..... | 75 |
| Hard carbon steel..... | 65 |
| Tempered high-speed steel..... | 52 |
| Annealed high-speed steel..... | 26 |
| Annealed carbon steel..... | 15 |
| Rolled brass..... | 15 |
| Cast brass (soft)..... | 11 |
| Lead..... | 3 |

It is to be noted that while the time-test readings place the materials in the same order of hardness as the scale test readings, the relative hardnesses indicated by the two methods are different. Additional results obtained from a series of metals under five conditions are shown in the diagram, Fig. 3.

Reversed Pendulum for Close Measurement

What is called the "reversed pendulum" is said to provide a sensitive method of investigating minute differences of hardness. This test requires careful manipulation and perfectly prepared specimens.

The law that the time of oscillation of a compound pendulum is inversely proportional to the square root of the length of the pendulum is said to hold good in the case of the pendulum hardness tester only when it is resting on a surface so hard as to be not appreciably indented. Generally speaking, a shortening of the pendulum lengthens the time of swing, but this is most marked on hard substances. On very soft sub-

stances the pendulum has nearly the same time of swing whether it is long or short or neutral or reversed, that is, with the center of gravity below, coincident with or above the center of the ball.

On hard substances the effect of shortening the pendulum to zero and reversing it are progressively: To lengthen the time of swing (i.e. to raise the hardness number); to render the pendulum much more sensitive to small differences of hardness; and to increase the numerical difference between the hardness numbers of specimens. For example, three specimens of high speed steel, *A B C*, which were supposed to be hardened alike were tested with the following results:

| Length of Pendulum | Specimen | | |
|---------------------------|----------|----|-----|
| | A | B | C |
| + 0.1 mm. | 57 | 58 | 62 |
| 0.0 mm. (neutral)..... | 66 | 70 | 75 |
| - 0.1 mm. (reversed)..... | 77 | 85 | 102 |

The difference between the hardness numbers *A* and *C* was magnified from 5 with the 0.1 pendulum to 25 with the pendulum reversed. In Fig. 4 similar results from eight different specimens are shown. It is to be noted that changes in the "pendulum length" of brass do not affect the hardness numbers, but as the materials increase in hardness the effect becomes greater.

Flat specimens are supported on the leveling table shown in Fig. 2 while being tested, and for irregular or cylindrical objects the universal ball vise shown in Fig. 1 is provided. Shafts, axles, gears and other heavy work may be tested in a vise or as they stand.

The "pendulum" is 12 in. long and will span flat surfaces 6 in. wide or cylinders 8 in. diameter. Screw

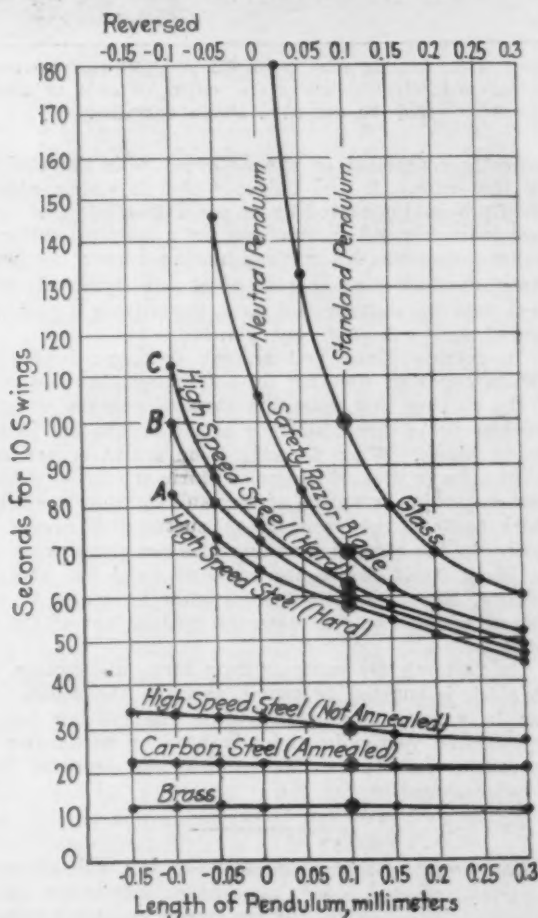


Fig. 4—Relation Between the Length of Pendulum and Time of Swing

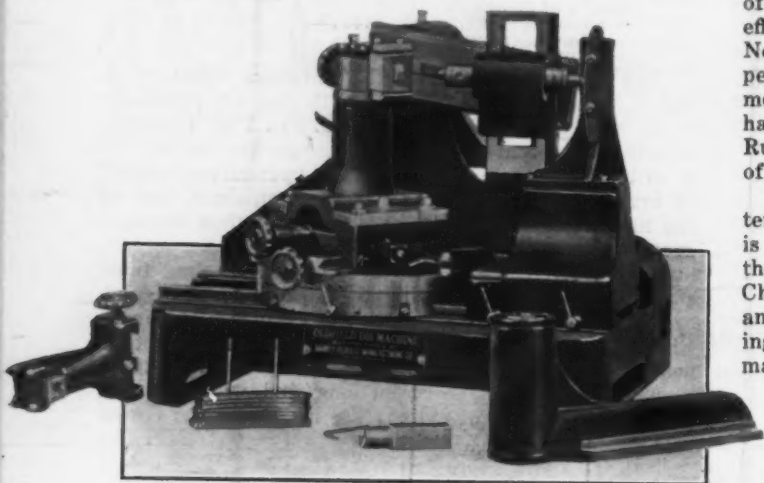
adjustment is provided for regulating the size of the bubble which tends to shrink in a very warm atmosphere. The instrument is otherwise unaffected.

The smaller instrument, 2 kg., is used with either ruby or steel balls. The larger pendulum is used with steel balls only and will test soft and hard materials up to and including hardened tool steels. It is less susceptible to surface imperfections than the lighter instrument and said to be more suitable for general shop testing.

Universal Die Cutting Machines

Machines for cutting dies of all classes, cutting at a single operation dies of compound, regular and irregular curvature, either concave or convex, is being marketed by the Barney Oldfield Mfg. Co., Los Angeles, Cal. Several sizes of the machine are available, the model shown being employed particularly on optical work in the production of lens laps.

The general construction of the machine may be noted from the accompanying front view illustration. It is made up of a work holding mechanism having universal adjustment and movement, which may be auto-



Machine for Cutting Dies of all Classes. Dies of compound, regular and irregular curvature, either concave or convex, may be cut at a single operation

matically controlled or synchronized with the oscillating tool arm. A tool holder which is either applied directly to and operated by an oscillating head, or operated indirectly when mounted on a vertical guide as shown, produces the cutting motion across the work. The work itself may be rotated at any radius of movement past the cutting tool path, permitting a combination of curves in different planes.

In cutting blank and similar dies and in sinking certain types of dies for drop forgings, the operation of the cutting tool upon the vertical column or guide provides for a direct slotting action across the face of the die blank. When forming tools are to be produced or drop forge dies of irregular form are to be sunk, a master cam or template of suitable contour is applied, which controls the path of the cutting tool across the work. In the case of blanking dies for press work the die block itself ordinarily remains fixed for straight slotting, although adjustments may be made to any desired position to facilitate the cutting out of the die opening.

On forming die work or drop forge die cutting the die block is rotated or swung through the desired radius in a horizontal plane while the cutting tool is reciprocated vertically and advanced or withdrawn by the master cam to suit the contour and depth of form to be produced in the die.

The United States Coal & Coke Co., subsidiary of the United States Steel Corporation, has taken up its option on fluorspar properties owned by the Kentucky Fluorspar Co. in Crittenden County, Ky. It is understood the purchase price was \$500,000. The Kentucky Fluorspar Co. has a number of other properties not included in this deal, which it will continue to operate.

The property and assets of the Muskegon Castings Co., Muskegon, Mich., was recently sold by the Federal Court to a committee representing the bondholders, consisting of P. P. Schnorbach and George M. Burr of Manistee and Harry Morris of the First Trust and Savings Bank, Muskegon Heights. Operations at the plant were concluded last fall.

Important Advances of Wages of Railroad Employees

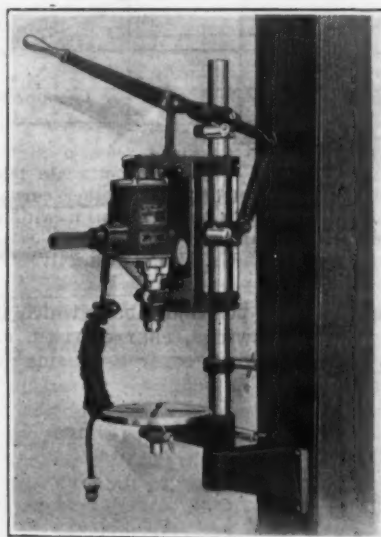
Further wage increases in railroad labor affecting roads the country over now mount to an aggregate of several millions of dollars. Increases totaling \$4,000,000 a year have been granted to 55,000 shopmen of the Pennsylvania Railroad. The new rates of 75 and 76c. per hour are retroactive to May 1. The present rate is 70c. Shopcraft and clerical employees were granted increases ranging from 3 to 7½c. an hour. The Philadelphia & Reading increase, affecting 10,000 workers, is estimated at \$780,000. An hourly advance of 2c. to track, shop and roundhouse laborers will take effect on the Bangor & Aroostook. Increases on the New York Central involve an additional annual expenditure of \$1,600,000, affecting approximately 20,000 men. The Jersey Central and the Baltimore & Ohio have also announced higher rates. An advance by the Rutland Railroad affects certain classes of maintenance of way and shop departments.

In the Great Northern Railroad advance to maintenance labor, amounting to 2 and 3¼c. an hour, there is a stipulation allowing 2c. additional per hour during the summer months. The increases on the Nashville, Chattanooga & St. Louis Railroad affect shopmen only, and amount to 2 and 3c. an hour. Increases amounting to \$10,000 and affecting 2500 employees have been made by the Chicago & Albany.

Portable Electric Post Drill

A portable electric drilling unit with a post drill stand, intended to convert the standard portable machine into a stationary type, has been placed on the market by the Standard Electric Tool Co., Cincinnati.

The hand drill may be detached conveniently and used as a portable unit. The bracket which holds the drill can be fitted at any point on the column and raised or lowered by means of a clamping screw. The method of mounting the lever and spring is intended to give quick return and easy feed. A slotted table is provided as shown, and is adjustable to any point on the column.



Post Drilling Stand for Portable Electric Drills

and the vertical travel of the drill 3½ in. The distance from the column to the center of the table is 6½ in. The diameter of the table is 9 in. The net weight is 75 lb.

Power Development in Alabama

BIRMINGHAM, ALA., May 28.—The Alabama Power Co. has placed in operation the second 24,000 hp. unit of Mitchell dam and the third is to come in within six weeks. With the second unit at Mitchell the company now has harnessed 165,000 hp. of hydroelectric current in Alabama and its steam auxiliaries have a capacity of 125,000 hp., to which is to be added the 90,000 hp. of the Federal steam plant at Muscle Shoals, now leased by the company. Practically all this power is available for mine and mill operation in Birmingham and adjacent territory through transmission lines.

Keen Interest in Coming of Immigrants

Employers Arranging to Get Their Share of Men Arriving in New Fiscal Year—Steel Manufacturers De- veloping Other Sources of Supply

BY L. W. MOFFETT

WASHINGTON, May 28.—Complaints of labor shortage in the iron and steel and allied industries, as well as in other basic lines and agriculture, have greatly increased interest in the immigration movement that sets in with the new fiscal year beginning July 1. Reports coming to officials in Washington indicate that large employing interests are preparing to take advantage of the movement and will have offices and agents at ports of debarkation for the purpose of recruiting as much labor as possible. It already is the practice of a number of industrial lines to obtain labor by this means and also by maintaining agencies in industrial centers. The iron and steel industry, as is known, is intensifying efforts to recruit labor.

Because the immigration movement is now so restricted, a great part of the work of getting employees in the iron and steel industry has been associated with the migration movement of negroes and Mexicans from the South and Southwest to the North. While this has been a source of some relief, iron and steel manufacturers have made known to Government officials their conviction that this class of labor never will acquire the efficiency of the typical steel mill laborer, such as the Slav. The statement has been made by an important iron and steel manufacturer that, rating the Slav at 100 per cent efficiency, the average colored worker in Northern steel mills would be rated at 80 per cent, while a considerably lower rating is given the Mexican laborer. Looked at from a point of loss of tonnage, it is maintained that the colored and Mexican laborers are extremely expensive, and especially at this particular time, when the iron and steel industry is fully engaged. Hope is expressed, however, that once this class of labor becomes accustomed to work in steel mills, it will develop much greater proficiency.

Help for Steel Industry

Meanwhile the iron and steel industry naturally is partial to the class of labor which it drew chiefly from Europe and surrounding areas so freely before the enactment of the 3 per cent immigration law. While at the best it will not now be able to get large numbers of employees from immigrants, there is keen interest being shown in the immigration movement beginning with the new fiscal year, with the hope that it will be possible at least to get some laborers from this source. As a matter of fact, however, the possible relief is not encouraging when the figures are analyzed.

Under the plan of straight quota immigrants, exclusive of exempted classes which do not go into industry, the number possible to be admitted under the 3 per cent law is 357,803 annually. The law permits every country to send 20 per cent of its quota in July of each year. It is believed that advantage will be taken of this provision to a greater degree next July than ever before. Granting that this is done, the immigration movement in that month would total approximately 60,000. As a matter of fact, it is believed the total will fall far below this number. It is realized also that perhaps not more than 10 per cent of these immigrants can be obtained as laborers in the iron and steel industry, so that at the best the number secured from the July movement would be less than 6000. Some officials believe that this figure might be cut by 50 per cent, making it less than 3000.

Unfilled Quotas

This calculation is based on the present status of the immigration movement and takes into account those countries which have not filled their quotas for the

present fiscal year and which probably will not. It is believed, however, that some of these particular countries will send in July 10 per cent of their quotas for the next fiscal year. These countries and the number of immigrants they lack to fill their quotas for the present year are: Germany, 18,000; Sweden, 5000; Norway, 3200; Denmark, 2000, and France, 1500. England still lacks 400 of making up her quota, but undoubtedly will have done this before the new fiscal year. The countries which have fallen short of filling their quotas, it has been pointed out, do not supply a great amount of steel mill labor, although that which it does afford is of a high grade character, including as it does Germany, and the Scandinavian countries. French labor, of course, is rare in steel mills.

The striking shortage of German immigration is attributed to several causes. Among them is the fact that the United States recently was an enemy country, but of more importance, it is believed, is the economic situation. It has been pointed out also that German workers actually do not have sufficient funds to pay for transportation to the United States.

The allowable quotas of immigrants from these countries are as follows: Germany, 67,607; Sweden, 20,042; Norway, 12,202; Denmark, 5619; France, 5729. Ten per cent of these totals, the number which it is estimated will come from most of these countries in July, is 11,120. Twenty per cent of the total quotas remaining, 245,963, is 49,193.

Such countries as Italy, Poland, Czechoslovakia, Rumania, the Lithuanian region, and Jugoslavia, which supply steel mills with much labor, are expected to send the full 20 per cent of their quota in July. Should this come about, the number coming from Italy would be 8400 out of the 42,057, its annual quota; from Poland 4200 out of its annual quota of 21,076; from Czechoslovakia, 2900 out of its annual quota of 14,957; from Rumania 1500 out of its annual quota of 7419; from Jugoslavia 1300 out of its annual quota of 6424; from Hungary 1120 out of its annual quota of 5638; and from the Lithuanian region 460 out of its annual quota of 6426. The total from these countries is only 19,680, but it is thought that other countries also will send the 20 per cent quota in that month, which will greatly increase their number. The United Kingdom has the highest allowable quota of all countries with a total of 77,342, and if it sent as high as 10 per cent of this total in July, it would represent 7734 immigrants. Russia, which has an annual quota of 21,613, no longer is a source of any considerable immigration and, therefore, should be taken out of the calculation.

Domestic Sources

While the iron and steel industry is showing deep interest in this new immigration movement beginning with the fiscal year, July 1, it is evident that it has adjusted itself to the fact that whatever changes may be made in the immigration laws, they will not be liberalized greatly. Because of this it is depending upon recruiting labor from domestic sources from which it has not drawn largely within the past and also is making earnest efforts with a great deal of success to overcome the shortage of labor by improving mechanical efficiency and by giving added incentives to increase the output production without increasing the manufacturing costs. High production figures in a number of lines, among them pig iron, sheet bars, billets and sheets, are taken to indicate the fact that the industry has had a great deal of success in this direction.

CANADIAN PRODUCTION

Increase in Iron and Steel—April Record of Blast Furnaces Notable

The production of pig iron during April by Canadian furnaces, amounted to 83,877 long tons, this being the greatest monthly record since November, 1920, when 93,925 long tons was made. The April production was 28.5 per cent greater than the output for March, which was 65,297 tons. The cumulative production of pig iron for the first four months of the present year was 67.2 per cent greater than for the corresponding period of 1922 and 18.1 per cent greater than for the period in 1921. Quantities produced for the four months were: 1923, 234,163 tons; 1922, 140,061 tons; 1921, 198,303 tons. The cumulative output of the present year to date, however, was less than the comparative figure for 1920, when 282,978 tons was produced during the first four months. Compared with figures for the previous month, the record in April showed that the output reported for the further use of reporting firms declined slightly, while the requirements for sale increased from 8,833 tons to 30,899 tons. The basic and malleable grades for sale

showed slight advances, but the greatest increase was effected in foundry iron, which increased from 4,603 tons in March to 22,839 tons in April. The production of ferroalloys also increased slightly from 2213 tons in March to 2258 tons in April. Early in April, two furnaces were blown in, one at Port Colborne, Ont., and one at Sault Ste. Marie, Ont., resulting in a total of nine furnaces in blast at the close of the month, namely, three at Sault Ste. Marie; two at Hamilton, one at Port Colborne, Ont., and three at Sydney, N. S.

The production of steel ingots and castings made a further advance in April when 92,598 long tons were produced, representing an increase of 3510 tons or 3.9 per cent over that of the month of March. The output for April was greater than for any month since November, 1920, when 97,120 tons was reported. The cumulative production of steel ingots and castings for the first four months of the present year was 276,184 tons as compared with 176,036 tons in 1922 and 127,036 tons in 1921 for the corresponding period. The cumulative production for the first four months of 1920 was 365,678 tons. The output of steel ingots for the further use of reporting companies increased from 85,393 tons in March, 1923 to 88,649 tons in April. Direct steel castings increased to 3949 tons compared with 3695 tons in March last.

The President's Disappointment Over the Report on the Two-Shift Day

WASHINGTON, May 29.—President Harding is represented to be disappointed over the report of the committee of the American Iron and Steel Institute indicating why it is inadvisable to abolish the two-shift day in the steel industry. While no pledge had been given to the President that the industry would adopt the 8-hour day, it is quite evident that he had hoped this would be the result of the conference which he, Secretary of the Treasury Mellon, Secretary of Commerce Hoover and Secretary of Labor Davis held with forty-one prominent iron and steel manufacturers at the White House on May 18, 1922. At that time Chairman Gary of the United States Steel Corporation, who acted as spokesman for the steel makers, said that it was unanimously resolved to appoint a committee to investigate the question.

President Harding is known to be strongly in favor of abolishing the 12-hour day, not only in the iron and steel industry, but elsewhere, and at the time he called the conference it was indicated that this was the first of a series of conferences determined upon by the President with a view to establishing a "gospel of understanding." It was stated at that time that the end sought was a "restoration of confidence" in the basic industries of the United States. This, it was maintained, was necessary in view of the trade revival which the President was confident was then at hand.

President Harding at the conference with steel men last year was made thoroughly acquainted with working conditions in the industry, so that he does not have the misconception generally prevalent in the public mind that the 12-hour day applies to all the units in the industry. He was made aware of the fact that not only had the United States Steel Corporation, for instance, entirely done away with the 7-day week, but had reduced the 12-hour day so that only 14 per cent of its employees were working on that basis at that time. The President, of course, was aware that the 12-hour day applied only to the continuous operations. At that time the President informed the steel men that there was no intention of Government interference in private business, but a statement issued at that time by his secretary, George B. Christian, said, "We are about to witness a great industrial revival and the only hope of abolishing the excessively long work-day was to do it before the full swing is resumed." The President explained that he had discussed the matter with individual heads and found much favorable sentiment, but there was a conviction that "the abolition is impracticable without substantially unanimous action by all the employing forces in the iron and steel industry."

Steel manufacturers at the White House conference

discussed the question of immigration and there was an opinion expressed by some of them then that the 3 per cent immigration law should be liberalized.

Safety Meeting on Welding and Cutting

The engineering section of the National Safety Council will hold its second meeting of the year at Detroit, in cooperation with the Detroit Safety Council on June 12.

In the morning, the subject of safety in welding and cutting will be discussed by experts representing the three modern methods: electric, gas and thermit, followed by a practical demonstration of the use of goggles to protect against the injurious visible and invisible rays, and a general discussion in which the industrial safety engineers in the audience will have opportunity to secure information on their own particular problems.

The afternoon will be devoted to the general topic of industrial sanitation and health work, with particular reference to the prevention of infections from the use of cutting oils.

Arthur H. Young, manager of industrial relations for the International Harvester Co. and last year's president of the National Safety Council, will talk at the banquet meeting on "Safety Work That Pays Dividends." At the same meeting Judge Alva R. Corlett, Cleveland traffic court magistrate, will tell of his experience in preventing street accidents by law enforcement. This is the last conference of the safety engineers before the twelfth national safety congress of the National Safety Council at Buñalo, Oct. 1 to 5.

Following is the program for the Detroit meeting which will be held in the Board of Commerce Building:

Morning Session

General Topic—Gas and Electric Welding and Cutting.
Safety in Electric Welding and Cutting.
Safety in Gas Welding and Cutting, by C. F. Worfolk, Michigan State Automobile School, Detroit.
Safety in Thermit Welding, by C. D. Young, Metal and Thermit Corporation, Chicago.
Eye and Face Protection for Welders and Cutters (with demonstration of effect of various kinds of glass in cutting down visible and invisible rays), by G. A. Kuechenmeister, Dominion Forge & Stamping Co., Walkerville, Ont.
Round Table Discussion.

Afternoon Session

General Topic—Health and Sanitation.
Cutting Down the Time Lost on Account of Illness, by Dr. F. G. Barr, medical director, National Cash Register Co., Dayton, Ohio.
Discussion led by Dr. Guy L. Kiefer, medical director, Michigan State Telephone Co., Detroit.
Prevention of Infections from Cutting Oils and Compounds.
Discussion led by Sanford DeHart, director, hospital and employment departments, R. K. LeBlond Machine Tool Co., Cincinnati.
"Paying the Price," a new first-aid film, shown by courtesy of the Travelers Insurance Co.

Confident That Prosperity Will Continue

Optimistic Sentiment Prevails at Meeting of Metal Branch
of National Hardware Association in Cleveland—
Industrial Conditions Freely Discussed

AN optimistic feeling prevailed, and the sentiment that there need be no worry over the business outlook, that the sheet steel industry is likely to be good the remainder of the year, and that the ultimate consumers of steel products are buying as freely as ever, was generally expressed by speakers representing various sheet mills at the twelfth annual meeting of the metal branch of the National Hardware Association, held at the Hotel Cleveland, Cleveland, May 25 and 26. The speakers also expressed satisfaction over the present lull and caution in buying, feeling that it had prevented a runaway market, and expressing a desire that prices remain around present levels. Another subject that aroused considerable interest, especially among jobbers, who gave it their hearty approval, was a proposal to reduce the number of items in terneplate by cutting down the gages, finishes and sizes. The meeting was attended by over 100 members, including manufacturers and distributors.

Chairman W. H. Donlevy, Philadelphia, in opening the meeting, spoke briefly regarding the present industrial situation. A discussion on the "Sheet Steel Outlook for the Remainder of the Year" was opened by Walter C. Carroll, Inland Steel Co., Chicago. He said that sheets now stand one-third in the list of steel commodities and represent 13 per cent of the finished ingot production of the country. To take care of the increased demand for sheets, the number of sheet mills in this country has increased to 659, and these have a capacity of 4,500,000 tons annually. The consumption has got up to a maximum rate of 8,000,000 tons annually and down to 2,000,000 tons, the average being about 3,500,000 tons. Mr. Carroll said that if a way could be found for partly leveling the peaks and valleys, the abnormal demand at times would be eliminated. The recent heavy demand has caused prices to advance to a point where they approached the danger point. Most sheet mills, he said, are more concerned about the fourth quarter than the third quarter orders. He believed that the present lull in buying is the best guarantee manufacturers have that the fourth quarter business will be heavy. He believed that the present period of prosperity would last a long time.

Present Buying Conservative

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Distributors' Standpoint" was opened by H. H. Riddle, George Worthington Co., Cleveland. He stated that for some time the sheet market has been satisfactory from a distributing standpoint, and he hoped that in case business fell off very much manufacturers would not go out and seek small orders for mill shipment at slightly above their car-lot prices but lower than jobbers' prices. Other jobbers discussed this subject, the general sentiment being against less than car-lot sales by manufacturers for direct shipment to consumers. Distributors felt that the recent let-up in buying will have a wholesale effect on the market.

Overhead Expense

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W. D. Taylor, president George Worthington Co., Cleveland, indorsed the plan of cutting down the items and said that this would result in distributors being able to make more profit and to sell cheaper. In his opinion it was up to the manufacturers to take steps toward the elimination of sizes and types. He declared that the bane of the jobbing business is in carrying too many items. Mr. Donlevy said that there is room for a great deal of elimination but that it was a matter for the manufacturers to get together on. He pointed out that in 1918 the association voted to reduce the

CANADIAN PRODUCTION

Increase in Iron and Steel—April Record of Blast Furnaces Notable

The production of pig iron during April by Canadian furnaces, amounted to 83,877 long tons, this being the greatest monthly record since November, 1920, when 93,925 long tons was made. The April production was 28.5 per cent greater than the output for March, which was 65,297 tons. The cumulative production of pig iron for the first four months of the present year was 67.2 per cent greater than for the corresponding period of 1922 and 18.1 per cent greater than for the period in 1921. Quantities produced for the four months were: 1923, 234,163 tons; 1922, 140,061 tons; 1921, 198,303 tons. The cumulative output of the present year to date, however, was less than the comparative figure for 1920, when 282,978 tons was produced during the first four months. Compared with figures for the previous month, the record in April showed that the output reported for the further use of reporting firms declined slightly, while the requirements for sale increased from 8,833 tons to 30,899 tons. The basic and malleable grades for sale

showed slight advances, but the greatest increase was effected in foundry iron, which increased from 4,603 tons in March to 22,839 tons in April. The production of ferroalloys also increased slightly from 2213 tons in March to 2258 tons in April. Early in April, two furnaces were blown in, one at Port Colborne, Ont., and one at Sault Ste. Marie, Ont., resulting in a total of nine furnaces in blast at the close of the month, namely, three at Sault Ste. Marie; two at Hamilton, one at Port Colborne, Ont., and three at Sydney, N. S.

The production of steel ingots and castings made a further advance in April when 92,598 long tons were produced, representing an increase of 3510 tons or 3.9 per cent over that of the month of March. The output for April was greater than for any month since November, 1920, when 97,120 tons was reported. The cumulative production of steel ingots and castings for the first four months of the present year was 276,184 tons as compared with 176,036 tons in 1922 and 127,036 tons in 1921 for the corresponding period. The cumulative production for the first four months of 1920 was 365,678 tons. The output of steel ingots for the further use of reporting companies increased from 85,393 tons in March, 1923 to 88,649 tons in April. Direct steel castings increased to 3949 tons compared with 3695 tons in March last.

The President's Disappointment Over the Report on the Two-Shift Day

WASHINGTON, May 29.—President Harding is represented to be disappointed over the report of the committee of the American Iron and Steel Institute indicating why it is inadvisable to abolish the two-shift day in the steel industry. While no pledge had been given to the President that the industry would adopt the 8-hour day, it is quite evident that he had hoped this would be the result of the conference which he, Secretary of the Treasury Mellon, Secretary of Commerce Hoover and Secretary of Labor Davis held with forty-one prominent iron and steel manufacturers at the White House on May 18, 1922. At that time Chairman Gary of the United States Steel Corporation, who acted as spokesman for the steel makers, said that it was unanimously resolved to appoint a committee to investigate the question.

President Harding is known to be strongly in favor of abolishing the 12-hour day, not only in the iron and steel industry, but elsewhere, and at the time he called the conference it was indicated that this was the first of a series of conferences determined upon by the President with a view to establishing a "gospel of understanding." It was stated at that time that the end sought was a "restoration of confidence" in the basic industries of the United States. This, it was maintained, was necessary in view of the trade revival which the President was confident was then at hand.

President Harding at the conference with steel men last year was made thoroughly acquainted with working conditions in the industry, so that he does not have the misconception generally prevalent in the public mind that the 12-hour day applies to all the units in the industry. He was made aware of the fact that not only had the United States Steel Corporation, for instance, entirely done away with the 7-day week, but had reduced the 12-hour day so that only 14 per cent of its employees were working on that basis at that time. The President, of course, was aware that the 12-hour day applied only to the continuous operations. At that time the President informed the steel men that there was no intention of Government interference in private business, but a statement issued at that time by his secretary, George B. Christian, said, "We are about to witness a great industrial revival and the only hope of abolishing the excessively long work-day was to do it before the full swing is resumed." The President explained that he had discussed the matter with individual heads and found much favorable sentiment, but there was a conviction that "the abolition is impracticable without substantially unanimous action by all the employing forces in the iron and steel industry."

Steel manufacturers at the White House conference

discussed the question of immigration and there was an opinion expressed by some of them then that the 3 per cent immigration law should be liberalized.

Safety Meeting on Welding and Cutting

The engineering section of the National Safety Council will hold its second meeting of the year at Detroit, in cooperation with the Detroit Safety Council on June 12.

In the morning, the subject of safety in welding and cutting will be discussed by experts representing the three modern methods: electric, gas and thermit, followed by a practical demonstration of the use of goggles to protect against the injurious visible and invisible rays, and a general discussion in which the industrial safety engineers in the audience will have opportunity to secure information on their own particular problems.

The afternoon will be devoted to the general topic of industrial sanitation and health work, with particular reference to the prevention of infections from the use of cutting oils.

Arthur H. Young, manager of industrial relations for the International Harvester Co. and last year's president of the National Safety Council, will talk at the banquet meeting on "Safety Work That Pays Dividends." At the same meeting Judge Alva R. Corlett, Cleveland traffic court magistrate, will tell of his experience in preventing street accidents by law enforcement. This is the last conference of the safety engineers before the twelfth national safety congress of the National Safety Council at Buñalo, Oct. 1 to 5.

Following is the program for the Detroit meeting which will be held in the Board of Commerce Building:

Morning Session

General Topic—Gas and Electric Welding and Cutting.
Safety in Electric Welding and Cutting.
Safety in Gas Welding and Cutting, by C. F. Worfolk, Michigan State Automobile School, Detroit.
Safety in Thermit Welding, by C. D. Young, Metal and Thermit Corporation, Chicago.
Eye and Face Protection for Welders and Cutters (with demonstration of effect of various kinds of glass in cutting down visible and invisible rays), by G. A. Kuechenmeister, Dominion Forge & Stamping Co., Walkerville, Ont.
Round Table Discussion.

Afternoon Session

General Topic—Health and Sanitation.
Cutting Down the Time Lost on Account of Illness, by Dr. F. G. Barr, medical director, National Cash Register Co., Dayton, Ohio.
Discussion led by Dr. Guy L. Kiefer, medical director, Michigan State Telephone Co., Detroit.
Prevention of Infections from Cutting Oils and Compounds.
Discussion led by Sanford DeHart, director, hospital and employment departments, R. K. LeBlond Machine Tool Co., Cincinnati.
"Paying the Price," a new first-aid film, shown by courtesy of the Travelers Insurance Co.

Confident That Prosperity Will Continue

Optimistic Sentiment Prevails at Meeting of Metal Branch of National Hardware Association in Cleveland— Industrial Conditions Freely Discussed

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grades of terne plate and took the matter up with the manufacturers but were unable to get them to agree, unless the manufacturers would agree among themselves nothing could be accomplished. H. N. Taylor replied that while the move did not succeed in 1918 he believed with the good offices of the Department of Commerce efforts toward the elimination might prove successful now.

Mr. Foote expressed the opinion that the manufacturers should decide what should be done but that they should be backed up by the jobber and consumer. Mr. Donlevy felt that it would be difficult to get the backing of the retail dealer and that the matter was one that the ultimate consumer knew little or cared little about. In his opinion, as there are very few manufacturers, it would be a simple plan for them to get together. Jobbers, he said, could not control the policy of the manufacturers but could only make recommendations.

Taylor Plan Indorsed

After further discussion, an informal vote of the distributors was taken and they approved Mr. Taylor's plan of reducing the number of items in terne plate to the four grades named.

During the discussion it was brought out that, as a result of conferences between Secretary Hoover's department and manufacturers a reduction in the number of items in expanded lath from 113 to 10 has been agreed upon.

Following a suggestion from Mr. Foote that a committee of the association on simplified practice be appointed to work with the Department of Commerce, Chairman Donlevy announced the appointment of three committees for that purpose, a committee on steel sheets with W. C. Carroll, Inland Steel Co., chairman, terne plate, H. N. Taylor, chairman, and eaves trough and conductor pipe, A. I. Moffat, Wheeling Corrugating Co., chairman. Later the latter committee reported in favor of using no material lighter than 28 gage for eaves trough and conductor pipe.

George H. Charls, general manager United Alloy Steel Corporation, Canton, Ohio, who discussed "Increasing Efficient Distribution of Sheet Steel Products," declared that the sheet steel industry is losing ground because of the lack of proper advertising and distribution. Of the total annual output 500,000 tons, or over 14 per cent, is being distributed by jobbers. In his opinion there are two vital problems affecting distribution. One is guaranteeing prices against a decline and

the other is the sanctity of contracts. The practice of the former encouraged buyers to overbuy. If it could be done legally, he would recommend that this matter be taken up by a joint committee of the metal branch and the National Association of Sheet Metal Manufacturers. He believed that a better stabilization of business would result if penalties for cancellations were provided in steel contracts. This would protect the buyers as well as the sellers, as cancellation clauses would make mills more conservative in taking on obligations.

Backward in Advertising

Mr. Charls declared that the manufacturers of iron and steel roofing had been backward in advertising and pushing sales of roofing, while makers of prepared roofing had been very active in pushing their products. He also urged the use of national advertising to stabilize business by smoothing out some of the peaks and valleys in the demand. He believed that by advertising business could be developed in certain lines during dull periods in other lines. For example, a demand might be developed for roofing steel when there is little demand for sheets from the automobile trade. He also thought that efforts should be made to provide laws that would help in stabilizing business by restraining inflation and restricting depression. Mr. Charls attributed the present lull to overbuying in the first quarter due to a fear of advancing prices and that railroads would be behind on deliveries. The discussion brought out a statement from F. M. Fuller, American Sheet & Tin Plate Co., that in his opinion the scarcity of tanners and their high wages had much to do with comparative demand for steel and prepared roofing. Many were using the latter, he said, because they could avoid the high labor cost by putting it on themselves.

A resolution was adopted authorizing the chair to appoint a committee of three to call on the officers of the Steel Corporation and the National Association of Sheet Metal Manufacturers to urge manufacturers to conduct either independently or jointly a publicity campaign to stimulate the demand for sheets.

The following were elected members of the metal committee to serve from 1923 to 1926:

J. George Fuchs, Bruce & Cook, New York.
Harry L. Doten, Austin & Doten, Boston.
Edgar Lyon, Lyon Conkin & Co., Inc., Baltimore, Md.
F. M. Fuller, American Sheet & Tin Plate Co., Pittsburgh.
W. H. Abbott, Wheeling Steel Products Co., Wheeling, W. Va.
M. C. Summers, Superior Sheet Co., Canton, Ohio.

Aims of Counsel in Basing Point Controversy

Policies of Opposing Parties as Shown in Hearings Now in Progress
in New York—Methods of National Association of
Sheet and Tin Plate Manufacturers

THE United States Steel Corporation in its defense of the complaint of the Federal Trade Commission in the so-called Pittsburgh basing point case has examined numerous witnesses during the past week at the office of the commission, 105 West Fortieth Street, New York, and in all of the testimony introduced has endeavored to bring out that there is at times a deficiency of steel in the Chicago district which must be met by shipments from other districts.

Counsel for the Steel Corporation is endeavoring to show that it is necessary for the Pittsburgh mills to seek a wide distribution for their output and that the freight rate from mills to destination is an essential part of the cost of steel to the consumer.

Further than this, the Steel Corporation has attempted to show that there is no "one price" on any steel product at any given time, but that a variety of prices is quoted by the various mills, the smaller mills in active periods of demand usually charging a so-called premium for quick delivery.

In cross examination of witnesses, counsel for the Federal Trade Commission has sought to bring out

that there is no deficiency of steel in the Chicago district, so far as the actual needs of that district are concerned, but that the steel mills located there attempt to cover intermediate territory, such as Detroit, for example, in which territory the Chicago mills are at somewhat of a disadvantage as regards freight rates.

Counsel for the Federal Trade Commission in cross examination of A. T. Hunt, general sales manager of the Seneca Iron & Steel Co., Buffalo, brought out for the first time in any of the hearings the details of the price information service of the National Association of Sheet and Tin Plate Manufacturers.

Mr. Hunt admitted that his company was a member of this association and that it exchanged information on sales and prices with other member companies through a bulletin service handled by W. S. Horner, secretary, from his office in Pittsburgh. Mr. Hunt stated that as sales are made each company reports the tonnage and the price at which the steel is sold, this information going to the secretary's office, where it is made up in the form of a compiled report of the whole membership. Names of the mills making the

sales and names of consumers are not given in the compiled report which goes out from Mr. Horner's office, said Mr. Hunt, and in some cases prices are not given. Mr. Hunt said that when a mill declines to give the prices at which sales were made it does not receive from the association the prices at which other mills are selling. "In other words," said Mr. Hunt, "the members get only what they give."

The average time elapsing from the booking of the order until the report listing that sale is sent to members is about three days, Mr. Hunt explained. He was asked by Mr. Steinhauer, counsel for the commission, whether Mr. Horner had not frequently called the attention of members to the desirability of having reports in his hands within 24 hours of the time the sale was made and answered that a printed request of this kind appeared on all of the blanks used by the association in sending out price information.

On further cross examination, Mr. Hunt revealed that on the last report he received there were four sets of prices on black steel sheets and all finishes taking the black sheet base. He said 10 mills were quoting one price, 12 mills were quoting another price and that the remainder of the mills were naming scattered prices somewhere between the other larger groups. He said there was \$3 a ton difference between the two larger groups. There are between 23 and 27 reporting members of the association, Mr. Hunt testified.

The question of extras was also brought out, Mr. Steinhauer asking whether the standard extras of the American Sheet & Tin Plate Co. were not generally followed by its independent competitors. Mr. Hunt's reply was that the extras quoted by his company vary somewhat from those of the American Sheet & Tin Plate Co. Asked to cite an instance of this, he stated that the Seneca Iron & Steel Co. asks \$5 a ton more for full pickled sheets than its large competitor. He admitted on further cross examination that on the whole the extras on sheets are fairly uniform with all mills.

As to the general course of market prices on sheets, Mr. Hunt stated that this market is one of the most mercurial of any department of the steel business. He said that in certain times there had been a difference of \$60 a ton in selling prices between the American Sheet & Tin Plate Co. and independent mills.

In the testimony of W. F. Vosmer, general sales manager of the Donner Steel Co., Buffalo, it was developed by counsel for the Steel Corporation and upon cross examination by the Trade Commission counsel that the Buffalo market does not afford a sufficient outlet for the bars produced in that district and that the mills are forced to ship to New England, Chicago, Detroit, and occasionally even to Pittsburgh. Mr. Vosmer said that his company would prefer to sell the bulk of its output close to home because by so doing the mill gets the benefit of its freight advantage. He said that his sales to Pittsburgh and Chicago were made only at such times as the demand is so great that mills located in those districts cannot fully supply it. Mr. Vosmer said that steel bars were generally sold at approximately the same levels, and that when there is a variation in price as between different producers there was usually a good reason for it, such, for example, as better delivery or better quality.

Other witnesses for the Steel Corporation during the week were W. E. Manning, vice-president and general sales manager of Youngstown Sheet & Tube Co.; Walter M. Wells, John A. Roebeling's Sons Co., Trenton, N. J.; Harold Stevens, general sales manager, Central Iron & Steel Co., Harrisburg, Pa.; John C. Jones, president Cleveland Steel Co., Cleveland; Charles K. Hardy, Jr., general sales manager, Wickwire-Spencer Steel Corporation; Paul M. King, general sales manager Worth Steel Co., Claymont, Del.; Charles H. Rose, auditor, Youngstown Sheet & Tube Co.; George W. Connors, Connors-Weyman Steel Co., Birmingham, Ala.; Frederick Connell, American Steel & Wire Co., New York.

The molders' union has made demands upon the union foundries of Cincinnati for an advance of \$1 per day in wages, and negotiations are now being conducted with a view of compromising the situation.

Industrial Advertisers to Meet

Addresses by representatives of industrial plants of the United States and Canada will be a feature of the meeting of the Industrial Advertisers' Association, to be held on June 5 and 6 in connection with the world advertising convention of the Associated Advertising Clubs of the World, at Atlantic City, N. J. Among these may be mentioned the following:

"What the Manufacturer Expects from His Advertising Department," by William Ridgway, president, Craig Ridgway & Son, Coatesville, Pa.; "The Economics of Industrial Advertising," by Jesse H. Neal, executive secretary of the Associated Business Papers, Inc.; "Selling the Industrial Market and Market Analysis," by Harry Tipper, manager, *Automotive Industries*, New York; "Advertising for the Manufacturer with Many Departments," by E. E. Leason, advertising manager, B. F. Sturtevant Co., Boston; "Cooperation Between the Advertising and Sales Department," by L. F. Hamilton, Walworth Mfg. Co., Boston; "What Can Mass Media Do for the Industrial Advertiser?" to be discussed by R. M. Nicholson, United Alloy Steel Corporation, Canton, Ohio; S. M. Fechheimer, Truscon Steel Co., Detroit; Galen Snow, Greenfield Tap & Die Corporation, Greenfield, Mass.; K. H. Bronson, Square D Co., Detroit, and H. V. Jamison, American Sheet & Tin Plate Co., Pittsburgh; "Simplification in Industry and Its Relation to Industrial Advertising and Selling," by F. M. Cockrell, McGraw-Hill Co., Inc., New York, and "Selective Methods in Machine Tool Advertising," by E. Payson Blanchard, Bullard Machine Tool Co., Bridgeport, Conn.

Committee reports will be received on standardization of industrial advertising literature from J. C. McQuiston, chairman, and on exhibits from Oscar S. Tyson, chairman. Bennett Chapple, American Rolling Mills Co., is chairman of the nominating committee.

Detroit Foundrymen's Association

The Detroit Foundrymen's Association closed its twentieth year as a successful organization with a banquet at the Michigan Club, Thursday evening, May 24. Fred Erb, Packard Motor Co., president of the association for the past three years, retired from that position and is succeeded by K. C. Babo of the Dodge Brothers organization. Robert Crawford, the Atlas Foundry Co. was elected vice-president; D. R. Hay, Sanford-Riley Stoker Co., was reelected secretary, and Fred Cowan became treasurer. The following were made members of the executive board: E. S. Van Dolson, Dodge Brothers; Fred Erb, Packard Motor Co.; E. I. Chase, Cadillac Motor Car Co.; H. M. Lane, H. M. Lane Co., and E. S. Pike, Detroit Steel Castings Co.

The speaker of the evening was Thomas F. L. Henderson, lecturer for the LaSalle Extension University, Chicago. Addresses were also given by Wells Utley, manager of the Detroit Steel Castings Co., and one of the organizers of the Detroit Employers' Association, and Pat Dwyer, associate editor of the *Foundry*, Cleveland.

Kansas Court of Industrial Relations

Owing to the popular interest in the nature and operations of the industrial court law of Kansas an account of the law and its workings through the period that it has been in effect has been published by the United States Bureau of Labor Statistics as Bulletin No. 322.

The methods followed by the United States Bureau of Labor Statistics in procuring and computing statistical information relating to labor forms the subject of Bulletin No. 326 recently published by the bureau. The bulletin gives examples of questionnaires and schedules used by agents in collecting material relating to wages and hours of labor, cost of living, retail and wholesale prices, volume of employment, strikes and lockouts, industrial accidents and workmen's compensation and insurance.

JAPAN INQUIRES FOR RAILS

Several Tenders Current—Large Tin Plate Order—Chinese Refuse to Buy Wire Shorts

NEW YORK, May 28.—Although the tendency in all export markets seem to be to await further developments in the present price situation in the United States before buying, Japanese inquiry from official sources and by large companies is of considerable volume, particularly on rails and tin plate. While 16,250 boxes of tin plate from an unnamed consumer are still pending and may, according to report, be temporarily postponed and several smaller inquiries for a few thousand boxes are also still under consideration, the largest recent tin plate tender, that of the Nippon Oil Co. for 34,600 boxes of oil can size has been awarded at what is termed a satisfactory price to the Mitsubishi Shoji Kaisha, which has placed the order with the Bethlehem Steel Co. for execution. The Bethlehem company has apparently sold Japan in the past three months close to 70,000 base boxes.

Japanese railroads and municipalities are quite as active as the consumers of tin plate. Among current inquiries upon which bids are being submitted, in addition to the 6000 tons mentioned in THE IRON AGE last week, there is a tender covering more than 13,000 tons of rails, another from the Imperial Government Railways for about 1700 tons of 75-lb. and 100-lb. rails and a tender from Tokio municipality calling for bids on 7 miles of 100-lb. and 10 miles of 92-lb. high T, girder rails, a total of about 3000 tons. The recent inquiry of Osaka municipality on 1200 tons of high T, girder rails, 14 meters long, was awarded to Mitsui &

Co., which placed the order with the Bethlehem Steel Co., 91-lb. sections being furnished.

The recent inquiry of the South Manchuria Railway Co. for bolts and nuts was awarded to Suzuki & Co. Another recent inquiry of the same railroad for about 200 tons of structural shapes for car building and a small tonnage of spring steel is also reported to have gone to an exporter in the United States. In addition to these inquiries for rails, there are a few requests for prices on light gage black sheets, with no orders reported and a tender from a large consumer in Japan for about 300 tons of ½ to 1½-in. steel gas pipe.

Japanese merchant buying, however, is light, the tendency evidently being strong to await further price recessions in the American market before attempting to place business. This same attitude also marks the Chinese buyer. Although the recent withdrawal of Chinese merchants from buying wire shorts because of the prices being quoted by American sellers has resulted in a considerable decline in wire short prices, no particular inclination to resume purchasing seems evident. Exporters to China report a fair volume of wire shorts particularly Nos. 6 to 16 gage being offered at prices that as a rule would figure out slightly higher than \$60 per ton, c.i.f. Chinese port, but no interest is evinced by the Chinese buyer. Offerings of second hand material are also rejected more often than usual, purchasers not offering to submit a counter offer on price.

Among South American railroads, the Chilean State Railways, 141 Broadway, New York, is closing bids on a small tonnage of car equipment and parts and will probably receive authorization shortly to issue a call for bids on the annual rail requirements of the State railroads.

BRITISH MARKET QUIETER

New Business in Pig Iron and Steel Falling Off—Export Demand Poor

LONDON, ENGLAND, May 17.—There has been considerable slackening in the buying of both pig iron and steel during the last week or so, which may be partly attributed to the lack of confidence of purchasers at home and abroad. The boom, which came as a result of the dislocation on the continent, caused a rushing up of prices on this side and, as continental supplies were more or less cut off, buyers had to turn to British material, and fairly extensive commitments were entered into. Now, however, buyers seem able to refrain from placing further orders until prices show more signs of stability.

Pig iron makers are well sold for the next month or two but cannot see their way to materially increase output, while costs remain so high, and in consequence some of the better grades of iron are still scarce. Prices remain stationary, with the exception of Cleveland No. 3, G. M. B., which during the last week has declined about 1s., a ton, but this, of course, is insufficient to stimulate new business. Hematite makers are not so well off and would probably be prepared to grant concessions if any substantial business were forthcoming. East Coast mixed numbers are quoted at 122s., 6d.

The same slackness has been noticeable in the finished iron and steel markets, export demand in particular being poor, while home consumers merely purchase to cover immediate requirements. Some mills are well booked but others are keen to secure business, and will probably be prepared to make considerable concessions if attractive orders were offered, but the orders are not forthcoming, and hence prices remain practically stationary.

Continental material has again been offering, mostly Belgian, very freely and at very cheap prices compared with those which our makers ask, but here, too, though fairly quick shipments can be given, little business has been forthcoming, buyers evidently not being prepared to risk late or no delivery. The labor

troubles in Belgium are a factor which is also militating against improved business, but latest reports indicate that this is likely to be settled before long. The decision of the German Government to permit goods purchased before Feb. 20 to be shipped under the required French license, put a little heart into traders here, as many thousands of tons of all kinds of material have been lying either at works or in barges ready for shipment, and so far several lots have come through, but further deliveries have of course been held up by the Antwerp strikes.

For Financing French Exports

PARIS, FRANCE, May 10.—A consortium composed of the great Paris banking establishments, who are the promoters of the scheme, as well as of a certain number of provincial banks, was constituted some time ago in view of submitting to the French iron trade a proposition for the financing of their export business. This consortium made recently an offer to that effect, but claimed as security for its advances of funds a bond on the inland credits of the trade. It is not probable, however, that this offer will ever be accepted, as it cannot be very well imagined that French iron and steel makers, who already show so much diffidence from one another in trying to arrange common prices, will agree to submit to other parties their invoices against inland consumers.

On the other hand, the French mechanical and electrical trades are now contemplating the creation of a joint export organization (Comptoir d'exportation), and a commission, presided by M. Prangey, is now following this question. M. Prangey is the manager of the Union Industrielle, which has contracted for the loans destined to the reconstruction of war-devastated metallurgical concerns. According to M. Prangey's plan, the comptoir would limit its activity to inquiries about the standing of foreign customers and to propositions to the Banque Nationale du Commerce Extérieur for opening credits applying to such customers. The members of the comptoir would not be responsible for such credits, which would be granted by the bank.

CONTENTS

May 31, 1923

| | |
|---|------------|
| Committee on Long Work Day Reports | 1545 |
| American Iron and Steel Institute Accepts Conclusions, Said Not to Be Final—President Gary Rebukes Pessimists—Believes Prices Are Now About Right | |
| Papers Read at the Institute Sessions | 1549 |
| Blast Furnace Linings, Gas Producer Practice and Alloy Steel Rolling Mills Discussed—Rôle of Chemistry and Waste Elimination—Time Study Standards | |
| New Type of Open-Hearth Reversing Valve | 1560 |
| Self-Contained and All Above Ground—Permits Regulation of Gas and Air Supply—Without Internal Moving Parts | |
| Quantity Tonnage of Automobile Castings | 1562 |
| Charging and Pouring Methods of Wilson Foundry & Machine Co., Pontiac, Mich.—Bull Ladles Used for Direct Pouring Into Molds | |
| Keen Interest in Coming of Immigrants | 1573 |
| Employers Arranging to Get Their Share of Men Arriving in New Fiscal Year—Steel Manufacturers Developing Other Sources of Supply | |
| Confident That Prosperity Will Continue | 1575 |
| Optimistic Sentiment Prevails at Meeting of Metal Branch of National Hardware Association in Cleveland—Industrial Conditions Fully Discussed | |
| Iron and Steel Exports Best Since June | 1606 |
| April Movement 13,551 Tons Above March, and Well Above 1922 Average—About 5 Per Cent of Our Finished Steel Production Shipped Abroad | |
| Boiler Tube Prices | 1559 |
| Machine for Slotting Locomotive Frames. | 1565 |
| Two British Premiers Were Steel Men. | 1565 |
| New Self-Feeding Bucket Loader..... | 1566 |
| Thermal Stresses in Steel Car Wheels..... | 1566 |
| Strength of Wire Rope Over Sheaves.... | 1566 |
| Motor Drive for Cone Headstock Lathes. | 1566 |
| Geared Head for "American" Lathe.... | 1567 |
| New Centerless Grinder..... | 1567 |
| Car Wheel Borer with New Features.... | 1568 |
| Building of Wagner & Co. at Lima, Peru. | 1568 |
| Pump for Cutting Lubricant..... | 1568 |
| Economies Claimed for New Drill Jigs.. | 1569 |
| Engineering Society of Buffalo..... | 1569 |
| Labor Shortage Curtails Operations..... | 1569 |
| Iron and Steel Exposition..... | 1569 |
| New Hardness Tester..... | 1570 |
| Universal Die Cutting Machines..... | 1572 |
| Advances of Railroad Wages..... | 1572 |
| Portable Electric Post Drill..... | 1572 |
| Power Development in Alabama..... | 1572 |
| Canadian Iron and Steel Production..... | 1574 |
| President Disappointed Over Two-Shift Report | 1574 |
| Safety Meeting on Welding and Cutting. | 1574 |
| Basing Point Controversy..... | 1576 |
| Industrial Advertisers to Meet..... | 1577 |
| Detroit Foundrymen's Association..... | 1577 |
| New York Export Market..... | 1578 |
| Editorials | 1580 |
| The Three-Shift Report—Steel Works Gas Producers—Conservatism and the Business Future—The Tariff and Steel Imports. | |
| Correspondence | 1582 |
| Wanted: A Book and a Photograph—What Is Effect of Galvanizing on Pipe?—The Machine Tool Situation in France. | |
| Iron and Steel Markets | 1584 |
| Comparison of Prices | 1585 |
| Prices Finished Iron and Steel, f. o. b. Pittsburgh | 1598 |
| Prices of Raw Materials, Semi-Finished and Finished Products .. | 1599 |
| Non-Ferrous Metal Market | 1600 |
| Personal Notes | 1602 |
| Obituary Notes | 1603 |
| Machinery Markets and News of the Works | 1611 |
| New York Jobbers' Prices | 1620 |
| Electric Steel Founders' Research Group. | 1583 |
| Coming Meetings | 1583 |
| New Company to Operate Mechanical Puddling Plant | 1595 |
| Steel Treaters' Eastern Sectional Meeting .. | 1596 |
| Dissipation of Iron..... | 1596 |
| Greatest Steel Production..... | 1597 |
| Squeak of Metals and Their Elastic Limit .. | 1600 |
| Secondary Metals in 1922..... | 1600 |
| Mr. Hoover Favors Amending Sherman Law | 1603 |
| Fabricated Steel Business | 1601 |
| Economy of Restoring Old Lifting Magnet | 1601 |
| Railroad Equipment Buying..... | 1601 |
| Fire Brick Rates Declared Prejudiced.... | 1601 |
| Production of Graphite in 1922..... | 1602 |
| 12-Hr. Shift in Industry..... | 1604 |
| Ford Motor Co. Plans Plant at St. Paul. | 1605 |
| Wholesale Prices Stationary..... | 1605 |
| Dispute as to Rail and Water Rates.... | 1605 |
| Wages of Blast Furnace Workers..... | 1605 |
| New Southern Rail Rates..... | 1607 |
| Malleable Manufacturers Consolidate.... | 1607 |
| Limiting Coke Production..... | 1607 |
| French Prices More Stable..... | 1608 |
| Luxemburg Lacks Coke..... | 1608 |
| Transfer of Land to Jones & Laughlin Steel Corporation | 1608 |
| Strikes in Belgium | 1609 |
| Building Stopped by Labor Trouble.... | 1609 |
| Technical Steel Problems Considered.... | 1609 |
| British Iron and Steel Market..... | 1578, 1610 |
| Drop in April Sheet Sales and Orders... .. | 1610 |
| Plans of New Companies..... | 1619 |

ESTABLISHED 1855

THE IRON AGE

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The Three-Shift Report

It was to be expected that the report of the American Iron and Steel Institute committee on the 12-hour day would be bitterly assailed by many newspapers and by leaders of organized labor. It is not to be denied, moreover, that public sentiment, which is strongly opposed to the long shift, is likely to judge unfavorably the decision of the committee that it "cannot at this time report in favor of the total abolition of the 12-hour day."

The difficulty about any reasoned consideration of the 12-hour day as it exists in the steel industry is that the public, even the more intelligent public, refuses to see anything in the question except overworked men on the one hand and grasping capital on the other. The daily press, which is the public's main source of information on industrial conditions, has never stated fairly or adequately the situation in respect to the continuous operations in iron and steel making. It may as well be set down as a finality that the facts as to the attitude of the workers to the 12-hour day, their earnings under it, and its physical, mental and moral effects upon them will never reach the majority of the American people in a way that will change its judgments on the question.

It matters not to those who have attacked the report that the law of the land has created a scarcity of the class of workers with strong arms and strong backs who want to make their natural endowment earn for them all it will. Nor does it matter that the steel industry throughout 1921 and 1922 contended with conditions which abolished profits and in many cases piled up heavy losses and compelled bond issues. What is economically possible at this time, what is just to the thousands of stockholders of the steel companies, what is wanted by the workers and by the consumers of steel, has no place in the prejudged case that has been put before the public in various editorials in the past few days.

Something would have been taken from the zest of corporation baiting had the authors of these attacks let it be known that the steel manufacturers' committee has yet to make its final report. Conditions existing when that report is

made may lend themselves to the carrying out of the desire expressed by President Gary a year ago in appointing the institute committee. At that time he said:

Let us commence this investigation with a determination to find ways and means of getting rid of the 12-hour day. Much depends upon the attitude of mind in approaching the subject. If we consider only the difficulties and see only the obstacles, we shall never accomplish anything. If we try to bring about the abolition of the 12-hour day, there is real reason to hope that we shall be able to do so.

On the same occasion, in telling of the conference between President Harding and 40 steel manufacturers at the White House, on May 18, 1922, Judge Gary said to the institute:

We told the President it was our desire to get rid of the 12-hour day, if practicable. We did not attempt to deny that there is strong public sentiment against the long day. . . . We assured him that we were open-minded and intended to do the right thing, realizing that the public interest is paramount and that our own interest should be subordinate.

As an earnest of their purpose to do away with the 12-hour turn, some of the steel companies introduced three shifts in 1921 and others in 1922, when labor was more plentiful than it is today. The result, as the report says, was a gradual reduction in the number of men working the long turn. No mention of such cases appears in the criticisms of the committee's report; nor is there any reference to the fact that at Youngstown, Ohio, as told in THE IRON AGE of May 17, very recently eight-hour shifts have been started in certain open-hearth employments where workers in sufficient numbers could be had.

At no time in the history of the American steel industry has so small a percentage of the workers been employed on long turns as is the case today. Contrary to the impression given to newspaper readers, that the 12-hour turn is the usual practice, the report of last week shows that only about one-fifth of the total number work on the two-shift system. That is, if 60,000 additional workers would be needed under three shifts, the 12-hour workers number about 120,000.

It could be wished that the committee had made unconditional its declaration that "if labor

should become sufficient to permit it, the members of this committee would favor entirely abolishing the 12-hour day." However, the conditions attached are far from being, as one critic charges, "arguments and assumptions which, if granted, would make the 12-hour day eternal." It is right that, as the committee suggests, the purchasing public should be satisfied with the necessary increase in the selling price of steel, also that "the employees should consent" [to something less than a 50 per cent increase in hourly wages], and further, that "industry generally, including the farmers," should approve. None of these conditions presents an insuperable obstacle. "Industry generally" already has the shorter work day and would not deny it to the workers in steel. The purchasing public should not find the added cost of the eight-hour turn a cause for complaint, seeing that market prices in recent years have shown fluctuations several times greater. And seeing that a very considerable number of workers already have gone from 12-hour to eight-hour shifts, the continuance of the process, when the labor supply will permit, is to be expected.

The members of the committee are well known in the steel industry—men of probity and sincerity, who appreciate fully, it need not be said, the responsibilities of their position. They have made a report that brings the steel industry nearer to the eight-hour shift and there is reason to believe that further progress will be shown when the final results of their investigations come to be written.

The Steel Works Gas Producer

Two notable papers on steel works gas producer practice have appeared this month. One was presented before the Iron and Steel Institute in London early in May and the other was a feature paper at the meeting last week of the American Iron and Steel Institute. The former, with its discussion, was reviewed in *THE IRON AGE* last week and the latter is abstracted in this issue. The British paper is by Fred Clements, who has made two other notable contributions to the institute, one on the blast furnace in 1920 and the other on open-hearth practice in May, 1922, which created wide interest in this country. Seldom have three papers so highly valuable and in different fields come from the same author. Mr. Clements' gas producer paper very clearly indicates how closely it is possible to approach in commercial operation those results which are usually accepted as a scientific basis of practice in that line. The American paper is an analysis in detail of gas producer practice and theory, and fairly may be rated as a classic.

The two papers bear particularly on the question of fuel economy, one of the most important now before the industry. Steel works operators are fortunate in having for reference the data they present. While fuel oil and coke oven gas and tar are more and more in competition with coal as a fuel for steel works, the gas producer will continue to hold its place of high importance. As with the papers on open-hearth furnace design

and operation presented in the past two years before the two institutes, this study of gas producer practice is calculated to yield results which can be measured in definite savings.

Conservatism and the Business Future

Business men have found that the key to many of the questions they have had to settle in the past few months lay in a comparison with the course affairs followed in 1920. It was easy to recognize that men would not repeat this year such mistakes as they made in 1920. A safe working rule was that in whatever respect this year appeared to be like 1920 the outcome would be different. Everything, of course, could not be different. If a manufacturer sold his goods he would cover his raw materials, just as he would do at any time. If there were a heavy demand for goods the price would tend to stiffen or advance.

Nothing unnatural could be expected to occur, but things that were done wrong in 1920 would not be likely to be done wrong in 1923. While, however, repetition of the mistakes of 1920 might be avoided, other mistakes might be made. There is, in fact, always room for making mistakes.

Following the wave of conservatism that has spread over business circles in the past few weeks, there is discussion as to the origin, the motive, and the probable result of the conservative advice that has been given. The declines in Wall Street have been recognized as an influence, but they are not a prime mover, since they represent the selling of shares by men who have themselves reached conclusions, based upon what they consider trustworthy information and logical deduction.

The origin of this wave of conservative feeling seems naturally ascribable to contemplation of what occurred in 1920. If so, men are intelligently endeavoring to escape—which should amount to preventing—a repetition of the 1920 collapse. Any danger that the possible participants foresee can usually be averted.

From this viewpoint, the conservatism in business sentiment is constructive, not destructive. Those who preach caution are not undermining confidence, but are endeavoring to produce conditions in which men rightly may place confidence. Everyone knows that if commodity prices or wage rates advance too far the advances produce trouble and a harmful reaction is forced. To try to prevent undue advances is to render a service to the people as a whole.

Early this year not a few business men adopted a working hypothesis that 1923 was likely to be a good year in business and 1924 a bad year. In some lines of business, to believe this was to induce conduct that would tend to make 1923 less active and 1924 more active than would otherwise have been the case. In other lines this principle would not operate. If a workman thinks there is work for him this year and will not be next year, he may seek all the higher wages for the present.

One cannot observe in detail the actual facts of the present industrial activity and believe that

it is marked for any early collapse. The recollection of 1920 might suggest this, but, as has been emphasized before in these columns, we are trying to do differently this time, and in many respects things have been quite different up to the present date.

A better citation, from the standpoint of the steel industry, might be what occurred in 1907. The steel mills entered that year with well-filled order books, while new buying was distinctly light, there being little recovery after the holiday dullness. In February there was a mild panic in the stock market. Then talk appeared of "a flood of cancellations" that might interrupt steel mill activity. The history, however, is that the record high production and shipments of steel did not occur until October, eight months later. Then there was a financial, not an industrial, panic, and it is not a financial panic that any one is talking of now.

The Tariff and Steel Imports

Since the new tariff law went into effect last September there have been two noteworthy developments in our foreign trade in iron and steel. The more important one is that total imports of iron and steel have risen to figures not equaled in many years. From October to February, inclusive, imports have amounted to 600,440 gross tons, or a rate of about 120,000 tons per month. In 1913, the last pre-war year, imports were only 20,400 tons per month. In the depression of 1921 they were only 7,000 tons. In 1922 the monthly average rose to 59,545 tons, augmented, of course, by the swell in the last quarter. It is to be noted that of the total imports in the five months ending with February nearly 92 per cent has been pig iron, ferroalloys and scrap, with scrap constituting over 23 per cent of the three items and pig iron almost 65.5 per cent.

The second development referred to is that for the first time in many years the excess of exports over imports of iron and steel has been a very small one, or only about 13,600 tons per month for the five months, October to February, inclusive. This is quite remarkable and emphasizes the decreasing exports, which at 133,600 tons per month for the five months referred to are the lowest in over ten years, except during the depression of 1921. Taking foreign trade movements as a whole, it has been the history of previous cycles that depressions produced a large export excess. Under present conditions Europe's feeble buying power and the low price levels of the countries of greatest currency depreciation have operated against the shipment of American steel abroad. At the same time there has been such a demand for steel at home that much less than the average amount has been available for export. Seeing that nearly 92 per cent of the imports in the five months ending with February was pig iron, ferroalloys and scrap, there is no reason to change the common view that the new duties on finished steel effective last September would tend to keep out foreign steel products. Pig iron made up the bulk of all that came in, and at 75 cents a ton the

pig iron duty is to be rated as merely nominal on a domestic market of \$30 and upward.

Valuable testimony as to the effect of molybdenum on the properties of steel was presented at the recent convention of American electrochemists in New York. It came from an independent investigator, one who has spent much time in studying the effect of the rarer metals in steel metallurgy—Dr. H. W. Gillett of the Bureau of Mines, Ithaca, N. Y. He designates molybdenum as a "real alloying element and more potent in its effect than any other element except possibly carbon." Calling attention to its air-hardening properties, he cited its striking effects in splitting or lowering the critical points of a steel, a valuable property in heat treatment. This is strong commendation. Molybdenum undoubtedly has an important place in steel alloys and possibly in others. Much is yet to be learned concerning its application. Like vanadium, it has had much to overcome in its early history and it has been hindered in its progress by over-large claims. But a good thing will not fail to find its rightful place.

CORRESPONDENCE

Wanted: A Book and a Photograph

To the Editor: My article entitled "How Bethlehem Became Armament Maker," which appeared in your issue of Nov. 23, 1922, has developed considerable correspondence on the various phases of the subject touched upon.

Among the letters received was one from a member of the family of Mrs. Frederick Brooks, who was a daughter of Alexander Lyman Holley, of whom I wrote, crediting him with having done more to introduce the Bessemer process in this country than anyone else. This letter says that just before Mrs. Brooks died some five years ago some man, intending to write a sketch of Mr. Holley's life, borrowed from her a book of freehand sketches made by him of different mechanical appliances used in the Bessemer process of making steel. The book has a sentimental value, and the family would like to secure its return.

I have tried to obtain a photograph of Lieut. William H. Jaques, U. S. N., who was secretary of the gun foundry board which went abroad and secured the options on the patent rights on armor plate manufacture for this country, but so far without success.

Perhaps if you can have space to print this letter, it may fall under the eyes of some of your readers who may be able to give me some information regarding the above matters.

H. F. J. PORTER.

29 West Thirty-ninth Street, New York

What Is Effect of Galvanizing on Pipe?

To the Editor: In a certain service the use of galvanized iron or steel pipe has for many years been customary, and in certain situations and under certain rules, compulsory.

In a recent contract, I specified a well-known make of iron pipe, some black and some galvanized. In some parts of the work, bends are preferable to fittings. It is customary to form these bends cold, with black pipe, but on attempting this with the galvanized pipe, it promptly failed. I might say here that the size of the pipe in question is 3 in. and the inner radius of bend 12 in. to 15 in. Heating was tried with no better success. The material seemed to possess no ductility and almost no fibrous structure.

The manufacturer sent its metallurgist to investi-

gate. He reported, in effect, that the galvanizing process brought about substantially those conditions and that there was no escape.

Now I have been using both black and galvanized iron and steel pipe for many years in the same and other services, and this statement comes to me as novel and seems to be of sufficient importance to invite discussion. No one with whom I have discussed the subject has ever heard of it before, although the manufacturer's representative states it to be well known.

In brief, is it true that the galvanizing process as employed in pipe mills has the effect of so changing the characteristics of the material that a pipe which may be easily bent, cold or hot, when black, cannot be so dealt with after galvanizing? If so, why? And, if so, why are sheets not similarly affected?

The subject has more phases than are indicated above because the safety of galvanized pipe under any circumstances immediately becomes important, and I hope therefore that it will receive some attention.

C. E.

Cleveland, May 26, 1923.

The Machine Tool Situation in France

To the Editor: May I take space to comment on some statements in an article on the French machine tool market by Capt. Godfrey L. Carden, appearing in THE IRON AGE of April 15.

Captain Carden says that there are still in France about 12,000 American machine tools which were imported during the war and which as yet have not found an outlet. Although we have not the means of checking it, this figure does not surprise us, as we know of considerable stocks of these machines in the hands of middlemen. We shall simply observe that types of machine tools which have not been improved in the course of recent years are in the minority. Therefore the danger of American machine tools now in stock rapidly becoming more and more obsolete and difficult to sell should not be minimized.

Captain Carden writes that in 1922 Germany exported 125,963 machine tools for metal working, weighing in all 59,725 metric tons, and that out of these 79,795 machine tools were shipped to France. Assuming a proportionate distribution of weight, the portion going to France would be, according to the above figures, 36,876 metric tons. However, if we refer to the official statistical data published by the French customs authorities, we find that in 1922 France imported from all countries only 19,318 tons of machine tools, as against 30,695 tons in 1921. We are led to believe, therefore, that there is probably some error in the figures given to Captain Carden.

Among the kinds of machine tools for which French production in the near future may be equal to French demand we mention boring, shaping and planing machines.

Important French Makers

During his last stay in France, Captain Carden visited the workshops of the firm of Bariquand & Marre, who rank certainly among the good French builders of machine tools. But there are others: for example, the makers of lathes, Gazeneuve & Ernault; the makers of milling machine, Huré, and Messrs. Gérony & Letureq at Albert (Somme), etc.

If Bariquand & Marre only employ the same number of workers as before the war—about 700—it should be noted that during the period of the war they had a personnel numerically much more important. They then produced war material, particularly parts of machine guns, and also machine tools for use in other works for producing war material. When the recent crisis was at its worst, they even employed fewer men than now, but the activity of the firm is now on the up-grade and when business is again in full swing no doubt it will considerably increase its personnel. Bariquand & Marre are constructing all kinds of machine tools, and in this they are perhaps liable to criticism, since there seems to be a consensus of opinion that as far as machine tools go only standardized (en série) construction is satisfactory and cheap. However, we

shall except the Bariquand milling machine, which is very well reputed and, in the opinion of users here, compares well with the celebrated American milling machine of Brown & Sharpe.

Bariquand & Marre are also building small tools and accurate instruments. Among the latter we mention a cylinder comparator for checking the bores of motors, which was a real success and is used throughout the world, notably in Great Britain and in America.

We shall add that Bariquand & Marre have also a section for the mechanical making of screws, and that if they could go through the crisis which began in the late months of 1920 without serious harm they owed it especially to the activity in shearing machines and water meters. They make all kinds of shearing machines, from the appliances used by hair dressers up to those intended for sheep-shearing.

VICTOR TRUANT.

Paris, May 5, 1923

[Captain Carden's attention was called to the above statement concerning the apparent disagreement between the German and the French figures relating to the machine tool trade. His reply is that the figures in his IRON AGE article of April 5 were furnished him at the United States consulate in Berlin and were taken from the German official statistics for foreign trade in the year ending Dec. 31, 1922.—Editor THE IRON AGE.]

Electric Steel Founders' Research Group

The Electric Steel Founders' Research Group held a regular meeting of executives of the five electric steel foundries conducting cooperative research work at Wernersville, Pa., on May 14 to 17. Those in attendance were: W. J. Nugent, vice-president of Electric Steel Co., Chicago; C. S. Koch, president, and H. J. Koch, secretary, Fort Pitt Steel Casting Co., McKeesport, Pa.; W. H. Worrillow, president, T. S. Quinn, treasurer, and K. V. Wheeler, general manager of Lebanon Steel Foundry, Lebanon, Pa.; R. F. Flinterman, president, and H. A. Neel, manager, Michigan Steel Casting Co., Detroit; C. R. Messinger, vice-president, R. J. Doty, vice-president, and B. Fleeger, treasurer, Sivyver Steel Casting Co., Milwaukee, Wis.; and R. A. Bull, research director of the group.

The various phases of the research work being done to improve the quality of steel castings and increase efficiency in methods were discussed in detail. Formal reports giving the status of the present research investigations were read on such subjects as facing sand mixtures, core sand mixtures, electric furnace practice, heat treatment of steel castings, production control, porosity in castings, etc. At this meeting plans were made for conducting research investigations on additional steel foundry problems. The results obtained from the work done so far have been so beneficial as to make it highly desirable to intensively study some of the additional complex problems involved in making thin section electric steel castings of intricate design.

COMING MEETINGS

June

National Association of Sales Managers. June 7. Atlantic City. Charles F. Abbott, chairman, 26 Madison Avenue, Montclair, N. J.

Taylor Society. June 7, 8 and 9. Hotel Onondaga, Syracuse, N. Y. Dr. H. S. Person, managing director, 29 West Thirty-ninth Street, New York.

American Society for Steel Treating. June 14 and 15. Spring Sectional meeting. Hotel Bethlehem, Bethlehem, Pa. W. H. Eisenman, 4600 Prospect Avenue, Cleveland, secretary.

American Society for Testing Materials. June 25 to 29. Annual meeting. Chalfonte-Haddon Hall Hotel, Atlantic City, N. J. C. L. Warwick, 1315 Spruce Street, Philadelphia, secretary.

Iron and Steel Markets

A QUIETER MARKET

Easier Deliveries As Steel Production Remains at High Rate

Railroad Work Awaits Developments as to Prices—Pig Iron Resales at Concessions

In what is probably the quietest week of the year in respect to new buying of finished steel, price developments have been meager. While new orders, as distinguished from specifications on old contracts, have fallen further below the total of shipments from mills, cancellations are negligible and the tonnage on which deliveries have been held up is relatively small.

Production in all districts is practically at the high rate of early May, and in the Chicago district is called the greatest on record. Unusually cool weather has favored mill operations, and it is believed the showing for the month will fully equal or even exceed that for April.

Under such conditions, with most buyers able to get needed material without paying premiums, the market for rolled steel may drift further without definitely developing a new trend. Meanwhile easier deliveries in some lines have encouraged buyers to count on getting material as wanted, with due allowance for some curtailment at mills from summer heat.

With the disappearance of premiums on plates and sheets in the Central West, buyers of semi-finished steel have been looking for some readjustment in slabs and sheet bars. In the latter better shipments are being made to sheet mills.

Independent sheet mills have come down to the prices recently established by the Steel Corporation, and in one or two cases slight further concessions have appeared.

Fabricated steel work is still lagging. The week's awards were only 7600 tons, while inquiries were less than 15,000 tons, substantially the same as in two previous weeks. On large structural shapes Pittsburgh deliveries can be had within six weeks.

In the East some railroad equipment business is held up for more definite development of the price trend. Some Jersey City work of the Lehigh Valley is also on the waiting list, and the first section of a Newark Bay bridge for the Central of New Jersey, 22,000 tons, may come up for re-bidding.

Of 1347 new cars ordered, the largest number

in three weeks, 1000 are for the Ford railroad. The Santa Fe has ordered 30 locomotives.

Bar iron can be had now from some Eastern mills at 2.40c., Pittsburgh, or \$2 a ton less than the usual price of recent weeks. Buying of soft steel bars is light in comparison with that of the first quarter, and consumers no longer need to pay above 2.40c. Pittsburgh to get reasonably early delivery.

Reselling of pig iron at low prices, especially Southern grades, has been more prominent and sales have been made as low as \$25, Birmingham, but on selling by furnaces \$25.50 is the minimum. In the Pittsburgh district Bessemer has declined 50c. and foundry and malleable \$1. Weakness has also developed in southern Ohio. In some centers a slight increase in activity is noted and in eastern Pennsylvania prices are being well maintained. A large Eastern consumer of basic iron is expected to buy shortly for July delivery, about 20,000 tons.

Since the first contracts for furnace coke for third quarter at \$6 some business has been done at \$5.75 and other furnaces are holding out for a \$5.50 basis.

The shortage of labor on Lake Superior has caused some of the underground iron mines to go on one shift. The ore movement has made the poorest start in several years, but there is ample time to meet all requirements. Considerable ore is yet to be bought.

April steel exports were 177,000 tons, against 164,000 tons in March. Rails were the largest item at 17,500 tons, while for the ten months ended with April they were 190,000 tons. Sheets have fallen off to one-third last year's movement, Japan taking much less. The total for 10 months has been 79,000 tons; in the same period last year it was 240,000 tons.

Pittsburgh

Sentiment More Cheerful, but Orders Fall Behind Shipments

PITTSBURGH, May 29.—The recent upturn in the securities market and the optimistic tone of Judge Gary's speech before the members of the American Iron and Steel Institute last week find reflection in a somewhat more cheerful sentiment in the iron and steel trade here, but it must be said that the reaction in a tangible way to those factors has not been well defined. Buyers still are inclined to pursue a conservative policy about new commitments and while the feeling is that business will not long remain quiet, it is well established that new orders have fallen further behind shipments in the past week. Cancellations are practically unknown and the amount of tonnage against which buyers have asked the mills to hold up shipment is not of disturbing proportions.

Buyers, however, are relying too much upon deliveries of steel already ordered for the entire comfort and satisfaction of manufacturers and while there has

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

| Pig Iron, Per Gross Ton: | May 29, 1923 | May 22, 1923 | May 1, 1923 | May 30, 1922 |
|------------------------------|--------------|--------------|-------------|--------------|
| No. 2X, Philadelphia... | \$32.76 | \$32.76 | \$32.76 | \$26.26 |
| No. 2, Valley furnace... | 29.00 | 30.00 | 31.00 | 24.00 |
| No. 2, Southern, Cin'ti... | 29.55 | 31.05 | 31.05 | 22.50 |
| No. 2, Birmingham, Ala.† | 25.50 | 27.00 | 27.00 | 18.00 |
| No. 2 foundry, Chicago* | 32.00 | 32.00 | 32.00 | 23.00 |
| Basic, del'd, eastern Pa. | 30.00 | 30.00 | 30.25 | 25.00 |
| Basic, Valley furnace... | 27.50 | 27.50 | 31.00 | 25.00 |
| Valley Bessemer, del. Pitts. | 30.77 | 31.27 | 32.77 | 26.96 |
| Malleable, Chicago* | 32.00 | 32.00 | 32.00 | 23.00 |
| Malleable, Valley | 29.00 | 30.00 | 31.00 | 24.50 |
| Gray forge, Pittsburgh... | 30.27 | 31.27 | 32.27 | 25.46 |
| L. S. charcoal, Chicago... | 36.65 | 36.65 | 36.65 | 29.00 |
| Ferromanganese, furnace... | 130.00 | 130.00 | 125.00 | 65.00 |

Rails, Billets, etc., Per Gross Ton:

| | | | | |
|--------------------------------|---------|---------|---------|---------|
| O.-h. rails, heavy, at mill... | \$43.00 | \$43.00 | \$43.00 | \$40.00 |
| Bess. billets, Pittsburgh... | 43.00 | 45.00 | 45.00 | 35.00 |
| O.-h. billets, Pittsburgh... | 45.00 | 45.00 | 45.00 | 35.00 |
| O.-h. sheet bars, P'gh... | 45.00 | 45.00 | 45.00 | 35.00 |
| Forging billets, base, P'gh. | 55.00 | 55.00 | 55.00 | 40.00 |
| O.-h. billets, Phila. | 50.17 | 50.17 | 50.17 | 40.77 |
| Wire rods, Pittsburgh... | 51.00 | 51.00 | 51.00 | 38.00 |
| | Cents | Cents | Cents | Cents |
| Skelp, gr. P'gh. lb. | 2.45 | 2.45 | 2.50 | 1.70 |
| Light rails at mill. | 2.25 | 2.25 | 2.25 | 1.50 |

Finished Iron and Steel,

| Per Lb. to Large Buyers: | Cents | Cents | Cents | Cents |
|----------------------------|-------|-------|-------|-------|
| Iron bars, Philadelphia... | 2.72 | 2.825 | 2.825 | 1.96 |
| Iron bars, Chicago. | 2.60 | 2.60 | 2.60 | 1.70 |
| Steel bars, Pittsburgh... | 2.40 | 2.40 | 2.40 | 1.60 |
| Steel bars, Chicago. | 2.74 | 2.74 | 2.84 | 1.70 |
| Steel bars, New York. | 2.74 | 2.74 | 2.74 | 1.88 |
| Tank plates, Pittsburgh... | 2.50 | 2.50 | 2.50 | 1.60 |
| Tank plates, Chicago. | 2.84 | 2.84 | 2.84 | 1.70 |
| Tank plates, New York... | 2.84 | 2.84 | 2.84 | 1.98 |
| Beams, Pittsburgh. | 2.50 | 2.50 | 2.50 | 1.60 |
| Beams, Chicago. | 2.84 | 2.84 | 2.84 | 1.70 |
| Beams, New York. | 2.84 | 2.84 | 2.84 | 1.98 |
| Steel hoops, Pittsburgh... | 3.30 | 3.30 | 3.30 | 2.25 |

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

†Silicon, 1.75 to 2.25c. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

| Sheets, Nails and Wire, | May 29, 1923 | May 22, 1923 | May 1, 1923 | May 30, 1922 |
|-------------------------------|--------------|--------------|-------------|--------------|
| Per Lb. to Large Buyers: | Cents | Cents | Cents | Cents |
| Sheets, black, No. 28, P'gh. | 3.85 | 3.85 | 4.00 | 3.15 |
| Sheets, galv., No. 28, P'gh. | 5.00 | 5.25 | 5.25 | 4.15 |
| Sheets, blue an'd, 9 & 10 | 3.00 | 3.25 | 3.25 | 2.40 |
| Wire nails, Pittsburgh... | 3.00 | 3.00 | 3.00 | 2.40 |
| Plain wire, Pittsburgh... | 2.75 | 2.75 | 2.75 | 2.25 |
| Barbed wire, galv., P'gh... | 3.80 | 3.80 | 3.80 | 3.05 |
| Tin plate, 100-lb. box, P'gh. | \$5.50 | \$5.50 | \$6.00 | \$4.75 |

Old Material, Per Gross Ton:

| | | | | |
|------------------------------|---------|---------|---------|---------|
| Carwheels, Chicago. | \$22.50 | \$23.00 | \$26.00 | \$18.00 |
| Carwheels, Philadelphia... | 23.00 | 24.00 | 25.00 | 17.00 |
| Heavy steel scrap, P'gh... | 21.50 | 21.50 | 24.50 | 17.50 |
| Heavy steel scrap, Phila... | 19.00 | 19.00 | 22.00 | 15.00 |
| Heavy steel scrap, Ch'go... | 19.00 | 19.00 | 21.50 | 14.50 |
| No. cast, Pittsburgh. | 25.50 | 25.50 | 27.00 | 18.50 |
| No. 1 cast, Pittsburgh... | 25.50 | 25.50 | 27.00 | 18.50 |
| No. 1 cast, Philadelphia... | 23.50 | 23.50 | 25.00 | 18.50 |
| No. 1 cast, Ch'go. (net ton) | 22.50 | 22.50 | 25.00 | 16.00 |
| No. 1 RR. wrot, Phila. | 23.00 | 24.00 | 25.00 | 17.00 |
| No. 1 RR. wrot, Ch'go. (net) | 16.50 | 16.50 | 20.50 | 12.75 |

Coke, Connellsville, Per Net Ton at Oven:

| | | | | |
|----------------------------|--------|--------|--------|--------|
| Furnace coke, prompt. | \$4.75 | \$5.00 | \$6.00 | \$6.00 |
| Foundry coke, prompt. | 5.75 | 6.00 | 7.00 | 6.50 |

Metals,

| Per Lb. to Large Buyers: | Cents | Cents | Cents | Cents |
|-------------------------------|-------|-------|--------|--------|
| Lake copper, New York... | 15.50 | 15.75 | 16.62½ | 13.87½ |
| Electrolytic copper, refinery | 14.75 | 15.25 | 16.37½ | 13.62½ |
| Zinc, St. Louis. | 6.40 | 6.75 | 6.80 | 5.25 |
| Zinc, New York. | 6.75 | 7.10 | 7.15 | 5.60 |
| Lead, St. Louis. | 7.05 | 7.00 | 7.60 | 5.45 |
| Lead, New York. | 7.30 | 7.25 | 7.75 | 5.75 |
| Tin (Straits), New York... | 41.75 | 41.75 | 45.25 | 31.25 |
| Antimony (Asiatic), N. Y. | 7.00 | 7.00 | 7.75 | 5.37½ |

Composite Price May 28, 1923, Finished Steel, 2.789c. Per Lb.

| | |
|---|--|
| Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets | May 22, 1923, 2.789c. May 1, 1923, 2.810c. May 29, 1922, 2.127c. 10-year pre-war average, 1.689c. |
| These products constitute 88 per cent of the United States output of finished steel | |

Composite Price May 28, 1923, Pig Iron, \$28.79 Per Gross Ton

| | |
|---|--|
| Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham | May 22, 1923, \$29.04 May 1, 1923, 30.79 May 29, 1922, 23.71 10-year pre-war average, 15.72 |
|---|--|

not yet been any breaking through the basic prices, the past week has seen the complete disappearance of quotations above those levels. The market is not above 2.40c. base, Pittsburgh, on bars nor above 2.50c. on plates and shapes, while Steel Corporation prices on sheets have generally become those of independent companies hitherto seeking more.

Delivery premiums on semi-finished steel also have disappeared since finishing mills, now getting full shipments against contract, no longer find it necessary to seek supplementary supplies. Steel works and rolling mill operations, particularly those of the former, are holding up in remarkable fashion for the time of year and it now looks as though May ingot production will be close up to that of March and April, if indeed it does not actually make a higher record.

The readjustment in pig iron prices continues and this week finds Bessemer grade 50c. and foundry and malleable grades down \$1 a ton as compared with prices a week ago.

Recent big purchases of heavy melting steel by a local steel maker do not seem to have strengthened the scrap market, as there are some dealers who still would

sell at today's prices or a little lower if they could find buyers.

Closing of a substantial tonnage of third quarter furnace coke at \$6 per net ton at ovens has been followed by more business of this sort at \$5.75, and some furnace interests which have still to buy all or part of their third quarter requirements now are talking \$5.50 as their idea of what they should pay. The price of coke made the price of iron in the first and second quarters but just now it looks as though the price of iron would determine the price of coke.

Pig Iron.—The market here still is easy with all grades except basic and low phosphorus down from levels of a week ago. There have been no further sales of basic of any consequence since a week ago and we continue the quotation of \$27.50 at furnace, although offerings at that price have not found takers. Sales of Bessemer iron have been entirely in small lots at from \$29 to \$29.50, Valley furnace. The largest sale was one of 250 tons at the lower figure. There has been considerable competition for such business in foundry iron as has come before the market and this has forced the price down to \$29, furnace, for the base

grade. We also note sales of malleable iron, some for third quarter delivery, at \$29, Valley furnace. The Westinghouse Electric & Manufacturing Co. is in the market for 250 tons of No. 1 foundry for its Cleveland plant for early delivery. Foundries in this district are getting a little more iron than they are melting and probably will carry over some tonnage into the third quarter. This makes it rather uncertain when they will start buying for that period.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being \$1.77 per gross ton:

| | |
|---------------------------------|--------------------|
| Basic | \$27.50 to \$28.00 |
| Bessemer | 29.00 to 29.50 |
| Gray forge | 28.50 to 29.50 |
| No. 2 foundry | 29.00 to 30.00 |
| No. 3 foundry | 28.50 to 29.50 |
| Malleable | 29.00 to 30.00 |
| Low phosphorus, copper free.... | 36.00 |

Ferroalloys.—Interest of buyers in new supplies is very low and producers appear more anxious for orders than they were recently. Consumers are well protected against their requirements of the next few months and there is evidence here and there that through lighter consumption than was figured on, purchases will carry consumers through the remainder of the year. This is true of one large user of spiegeleisen, whose purchases at the time they were made were thought to be sufficient to go through only the third quarter. Shipments of ferromanganese and 50 per cent ferrosilicon on contracts are sufficiently full and prompt enough to obviate the necessity of spot purchases. Prices are given on page 1599.

Semi-Finished Steel.—The supply situation is growing steadily easier, due to the fact that producers, having fewer new demands for finished material, have more steel to apply on semifinished steel contracts. Finishing mills no longer find it necessary to supplement deliveries of contract tonnages with open market purchases, especially as steel moving on contract is priced well below today's open market prices. Producers still are talking \$45, Pittsburgh or Youngstown, for rolling billets, slabs and sheet bars, but it is observed that higher quotations have disappeared with the subsidence of early shipment inquiries and that on a recent sale of 1500 tons of 1½-in. Bessemer billets, the price was \$45. Some mills, among them the seller of this tonnage, hitherto have been exacting an advance of \$1.50 to \$2 per ton over the base size for small billets. As the extra for size was not waived in this case, the market on the base size of Bessemer billets, apparently, is as low as \$43. The market has not yet broken through \$45 on open-hearth billets, slabs or sheet bars, but a firm bid of less would get serious attention. Forging billets do not yet appear to be available at less than \$55, base. The edge is off the market for wire rods and while we note one sale of 400 tons for immediate delivery at \$55, base, that price no longer is easy to obtain and it is generally believed that third quarter contracts of independent makers will carry the present price of the American Steel & Wire Co., of \$51, base. Buyers now find it easy to obtain supplies of pipe skelp at 2.45c. Prices are given on page 1599.

Wire Products.—Demand for nails and plain wire is holding up strongly with mills in this territory and on account of the shortage of labor, they are not making enough headway in reducing their obligations to be able to take on more than a small part of the business offered. Demands for woven fence and other products finding heaviest use among the farmers is light, as usual at this time of year, and if labor was plentiful or shifting from one kind of work to another could be done easily, production of other lines could be increased materially by the diversion of the steel now going into fence, barbed wire and staples. Much of the current production of these lines is being stocked against future demands. Prices may be regarded as firm. They will be found on page 1598.

Steel Rails.—There are more sellers of light rails than buyers and prices favor buyers since there is pretty sharp competition for orders. Some makers are asking 2.35c., base, mill, 2.25c. is the top of the

market as far as sales are concerned. A better inquiry for coal has not strengthened prices to a point where operators are disposed to increase production and consequently to need more rails.

We quote 25 to 45-lb. sections, rolled from new steel, 2.25c. base; rolled from old rails, 2.15c. to 2.20c. base; standard rails, \$43 per gross ton mill for Bessemer and open-hearth sections.

Tubular Goods.—Although the market is quieter in that inquiry, notably from the oil industry, has tapered off somewhat, the supply situation remains tight because live orders are absorbing current production so fully. A few suspensions of shipments are reported, but they appear to be welcome to producers, who have so many places to put the released tonnages. The industry can stand a considerable period of quiet, because mill bookings represent at least 60 days' production at reasonably full capacity and the present rate of operations, it is claimed, cannot be maintained when warm weather arrives. Moreover, construction and oil and gas well drilling that has been started cannot be very well shut off. Discounts are given on page 1598.

Sheets.—The past week has witnessed the virtual disappearance of prices above the American Sheet & Tin Plate Co. schedules. While there are occasional sales of black sheets for early delivery at 4c., base, the prevailing price for either prompt or third quarter business is 3.85c. Similarly, 5.25c., base, is still asked and obtained on galvanized sheets, but by a little "shopping" buyers are finding some mills which will take orders for delivery as promptly as two or three weeks at 5c., base. Mills which elected to take orders instead of contracts lately have found orders rather few, notably in black sheets and have found it necessary to modify their price ideas, with buyers getting full shipments against contracts carrying even lower prices than prevail today. Delivery premiums on automobile sheets also have disappeared. Light gage blue annealed sheets still are a little hard to obtain under 3.25c., base, but heavier stock is readily had at 3c., base. Supplies have caught up with consumption and there is still much open third quarter capacity among independent mills. Prices are given on page 1598.

Tin Plate.—Prices above \$5.50 per base box, Pittsburgh, have practically passed. Although mill operations are somewhat affected by labor shortages, it is noted that production is not decreasing much and shipments are moving forward freely enough to relieve consumers of the necessity of supplementing shipments with open market purchases. Some mills probably would not entertain inquiries from irregular customers at \$5.50, but there is less tendency to go as high as \$6 on such demands. The market appears to be quotable in a general way at from \$5.50 to \$5.75 per base box.

Hot-Rolled Flats.—Except for narrow, light gage material, there is no longer occasion to quote products under this heading at above 3.30c., base, Pittsburgh. Mills able to take on narrow, light stock are asking 3.50c., base, as a minimum, but find new buying a little slow even at that level, which is about \$5 a ton under what was recently quoted. Mills generally, have good order books, but with new buying on a moderate scale, obligations are being steadily reduced. Prices are given on page 1598.

Cold-Rolled Strips.—Buying for early delivery has pretty well stopped and thus far third quarter business has reflected conservatism among buyers. Specifications against second quarter contracts are good, despite some suspensions by the automotive industry. Prices above 5.25c., base, have disappeared with the passing of quick shipment demands.

Bolts, Nuts and Rivets.—Both orders and specifications have been lighter with leading bolt and nut makers in this district lately and the supply situation also has grown easier from the fact that little difficulty now is experienced in securing ample supplies of steel. Rivet makers believe the base price of large structural and ship rivets should be 1c. per lb. over the price of steel bars and that being 2.40c., would mean \$3.40 per 100 lb. for rivets. No effort yet has been made to advance rivet prices, and with business on a lighter

scale, an advance now seems unlikely. Prices and discounts are given on page 1598.

Iron and Steel Bars.—Buyers no longer have to go above 2.40c. for soft steel bars. While some makers have very full order books, there are others who need business sufficiently to be glad to get it at that figure. There are reports that as low as 2.35c. has been done, but local mills deny having shaded 2.40c. Makers of iron bars have not changed their prices.

We quote soft steel bars, rolled from billets, at 2.40c., base; bars for cold-finishing of screw stock analysis, \$3 per ton over base; reinforcing bars, rolled from billets, 2.40c., base; refined iron bars, 3.25c. base, in carload lots or more f.o.b. Pittsburgh.

Structural Material.—New demands upon the mills are falling behind shipments and obligations being reduced. Promises of deliveries are being advanced. There has been no shading of the regular price of 2.50c., Pittsburgh, in this district, but on large structural shapes delivery as early as six weeks is now being promised. Fabricating shops here still have considerable business ahead of them, but also are reducing their obligations since there has been a decided pause in new business. Plain material prices are given on page 1598.

Plates.—Although production for the next two or three months with a number of mills has been pretty well spoken for, there are enough makers who are not in this position who want orders that it is no longer necessary for buyers to go above 2.50c., base, Pittsburgh, to find accommodations. New business is moderate, but buyers are specifying well on old orders. Prices are given on page 1598.

Cold-Finished Steel Bars and Shafting.—Buyers are specifying fairly well on old orders, but new business is light and users generally are moving slowly in the matter of third quarter contracts. Tonnage has been offered makers at slightly below the regular market quotations, but so far as can be learned, has not found acceptance. We continue to quote rolled and drawn bars at 3.25c., base, Pittsburgh, for carload lots, and ground shafting at 3.65c., base, f.o.b. mill, for carload lots.

Coke and Coal.—Some curtailment of production in the Connellsville district has failed to check the downward tendency of spot coke prices, which are down 25c. a ton from last week's levels. A like decline in the contract price indicates anxiety on the part of producers to get orders on their books. Spot tonnages of furnace coke have been readily available lately at \$4.75 per net ton at oven, for strictly standard grade, and more lately has been obtained with decreasing frequency. Most of the contracts for furnace coke since a week ago have been at \$5.75 per net ton at oven. One large operator is said to have sold 80 per cent of his third quarter production at prices ranging from \$6 down to \$5.75, but this is an exceptional case and blast furnace interests which are still uncovered are holding off for further declines. Spot foundry coke is quotable from \$5.75 to \$6.50 per net ton, ovens. There has been considerable adjusting of prices of foundry coke contracts, bringing them more in line with prices currently quoted on spot tonnages. Inquiry for coal is livelier and the market has a stronger undertone. Prices of the past few weeks, however, cannot be altered. Mine run steam coal of the better sort is quotable from \$2 to \$2.25 per net ton at mines, and mine run gas and coking coal from \$2.50 to \$2.75. Producers have rather stiff ideas as to screened coal because there is such a poor market for slack at present.

Old Material.—Recent big purchases of heavy melting steel by a large local independent steel company do not seem to have stimulated interest in the market by other melters or to have produced a stronger market. There are dealers who still are open for orders at the same prices as paid by the recent buyer. Other grades are very slow of sale, melters believing they will buy to better advantage later. The market derives a little strength in some grades, notably turnings and borings on purchases by dealers who fear cancellations and are buying against sales to insure earlier delivery than they might otherwise make. As high as \$19 has been paid for machine shop turnings, up to \$25 for

heavy melting steel and as much as \$20 for borings by dealers thus situated.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

| Per Gross Ton | |
|--|--------------------|
| Heavy melting steel..... | \$21.50 to \$22.00 |
| No. 1 cast, cupola size..... | 25.50 to 26.00 |
| Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa. | 22.50 to 23.00 |
| Compressed sheet steel..... | 21.00 to 21.50 |
| Bundled sheet sides and ends... | 19.50 to 20.00 |
| Railroad knuckles and couplers... | 25.00 to 25.50 |
| Railroad coil and leaf springs... | 25.00 to 25.50 |
| Low phosphorus standard bloom and billet ends..... | 27.50 to 28.00 |
| Low phosphorus, plates and other grades | 26.00 to 26.50 |
| Railroad malleable | 24.00 to 24.50 |
| Steel car axles..... | 26.00 to 26.50 |
| Cast iron wheels..... | 23.00 to 23.50 |
| Rolled steel wheels..... | 25.00 to 25.50 |
| Machine shop turnings..... | 18.50 to 19.00 |
| Heavy steel axle turnings..... | 20.50 to 21.00 |
| Short shoveling turnings..... | 18.50 to 19.00 |
| Cast iron borings..... | 19.50 to 20.00 |
| Heavy breakable cast..... | 22.00 to 22.50 |
| Stove plate | 17.50 to 18.00 |
| Sheet bar crop ends..... | 26.50 to 27.00 |
| No. 1 railroad wrought..... | 18.00 to 18.50 |

Bibliography of Colloid Chemistry

The National Research Council has recently issued a colloid bibliography in mimeographed form. The author, Dr. Harry N. Holmes of Oberlin College, chairman of the National Research Council committee on the chemistry of colloids, intends this edition to be preliminary to a more comprehensive one. Yet it is a book of 135 pages containing 1800 references on 106 topics. All the references are classified and many are accompanied by brief comment as an aid in deciding on their relative importance. This book may be purchased from the Washington office at \$1.

The theoretical and industrial importance of colloid chemistry is now admitted without question. In fact it links together the sciences of chemistry, physics, zoology, botany, geology, medicine, agriculture and even astronomy whenever that science deals with comets'-tails. Few are the industries that do not have colloid problems to solve. The average citizen is surprised to learn that his own body is colloidal in composition, that his digestive processes are governed by colloidal rules of action and that the bacteria of disease are of a colloidal degree of dispersion. And he is astonished to learn that but for the colloidal adsorption of calcium phosphate from the blood stream by his bony cartilage he would be a mere spineless jelly fish. And as colloid chemistry is surface chemistry, it is of importance to this same average citizen to know that the total surface of his blood corpuscles is about one acre. Plant and animal tissue is largely colloidal, too, and should be studied from that viewpoint.

Preparing to Handle Shipments of Pig Iron

BIRMINGHAM, ALA., May 29.—The Arrow Transportation Co. is adding to its equipment on the Tennessee river for handling the Sheffield and Florence iron of the Sloss-Sheffield Steel & Iron Co., in conjunction with the Burlington and other railroads at less than all-rail rates. With the coming resumption at the newly-acquired Sheffield Iron Corporation furnace at Sheffield, the Sloss-Sheffield Steel & Iron Co. will have 25,000 tons of iron per month available for this low-rate movement into Chicago territory and this will further strengthen Muscle Shoals iron in Western competitive fields.

With the completion of a plant for Jenkins Brothers, South Main Street, Bridgeport, Conn., valves, the work which for many years has been done for this company by Crane Co., Bridgeport, will be taken over by the Jenkins Company, which expects to employ about 500 men. The Crane Co., on the other hand, expects to transfer to Bridgeport enough of its Chicago plant business to make up for the temporary loss through the Jenkins interests.

Chicago

Pressure for Deliveries Continues—Steel Output Heaviest on Record

CHICAGO, May 29.—The outstanding feature of the market is the insistent pressure for steel deliveries from all sources. This is indicative of sustained consumption and an absence of heavy stocks in the hands of buyers. Buying is limited, but it can at least be said that demand is growing no smaller. Prices are stationary and appear to be becoming even steadier as the outlook in various lines of consumption becomes clearer. Notwithstanding some recent reports to the contrary, there has been no appreciable slowing down of the automotive industry.

Building activity is holding up to a greater degree than was expected following the widely reported postponement of prospective work. Reinforcing bar awards are heavy and while fabricated steel lettings for the week are light, there is considerable pending business and a number of promising inquiries have come into the market. Railroad car buying is undeniably small, but builders are confident that orders will again be placed as soon as they are able to offer satisfactory deliveries. On the other hand, the roads are buying considerable steel for the repair of cars in their own shops.

Local mill operations are unchanged, with steel output the heaviest in the history of the Chicago district.

Pig Iron.—The market shows a little more activity and the idea that a period of declining prices is ahead does not so generally prevail. In the meantime furnaces are fortified with commitments covering from 25 to 35 per cent of their third quarter make and are in a position to wait until melters see fit to enter the market. That consumption is sustained is indicated by the pressure for shipments. While Northern furnaces are keeping abreast of specifications, there are still one or two Southern producers who are behind on deliveries. Local prices are holding steadily. A sale of 600 tons of foundry to a local melter for third quarter was closed at \$32 base, furnace, and the same may be said of 200 tons of foundry for prompt shipment in the Chicago switching district. The lowest going price on Southern foundry appears to be \$26 base, Birmingham, although some business is still being taken at \$27. A relatively small tonnage, part of it off grade material, was recently disposed of for prompt shipment at as low as \$25 base, Birmingham. Prominent among current inquiries for third quarter may be mentioned 500 tons of foundry wanted by a northern Wisconsin melter, 500 tons of charcoal desired by another Wisconsin user and 250 tons of charcoal for a Minnesota destination. A Milwaukee furnace is now producing low phosphorus and while there have been no recent sales of this grade, it is available at from \$37 to \$38, delivered Chicago.

Quotations on Northern foundry high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards or, when so indicated, f.o.b. furnace other than local:

| | |
|--|------------------|
| Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago..... | \$36.65 |
| Northern coke, No. 1, sil. 2.25 to 2.75.... | 33.00 |
| Northern coke, foundry No. 2, sil. 1.75 to 2.25 | 32.00 |
| Malleable, not over 2.25 sil..... | 32.00 |
| Basic | 32.00 |
| High phosphorus | 32.00 |
| Southern No. 2..... | \$32.01 to 33.01 |
| Low phos., sil. 1 to 2 per cent, copper free (nominal) | \$37.00 to 38.00 |
| Silvery, sil. 8 per cent..... | 44.29 |

Ferroalloys.—Interest continues to be shown in spiegeleisen and the market remains firm at \$45, Eastern furnace, for forward delivery, and \$47.50 for prompt shipment. A report that \$43 can be done appears to have no foundation in fact, as the most recent sale, involving 100 tons for forward shipment, was closed at \$45.

We quote 80 per cent ferromanganese, \$132.56 for second half delivery and \$137.56 for prompt shipment; 50 per cent ferrosilicon, \$95, delivered; spiegeleisen, 18 to 22 per cent, \$53.58 to \$56.08, delivered.

Rails and Track Supplies.—No new developments in the rail market are reported. The distribution of the New York Central order for 175,000 tons has not yet been announced and the Pennsylvania has not formally closed for its rails. There are numerous orders and inquiries for small lots of track fastenings, but demand for light rails is negligible. The coal mines, which are the principal consumers of light rails, are not operating more than two or three days a week.

Standard Bessemer and open-hearth rails, \$43; light rails, rolled steel, 2.25c., f.o.b. makers' mills.

Standard railroad spikes, 3.25c. mill; track bolts with square nuts, 4.25c. mill; iron tie plates, 2.85c. mill; steel tie plates, 2.60c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.80c. base and track bolts, 4.80c. base.

Plates.—Buying is limited, but specifications are heavy and pressure for deliveries is unabated. In fact, the rate of operations at plants of car builders is largely governed by deliveries of steel from the mills. Purchases of plates, shapes and bars by the railroads for car repairs and other work are fully up to the average for this year.

The mill quotation is 2.60c., Chicago, for indefinite delivery and 2.84c. delivered Chicago for specific shipment. Jobbers quote 3.30c. for plates out of stock.

Structural Material.—Fabricating awards have fallen off, but new inquiries are fairly numerous. The recent slump in building activity, in fact, appears to have been exaggerated. It is undeniable that there has been a decline in projects involving large tonnages, but it is a question whether this decline is more marked than is usually the case at this season of the year. The price situation is unchanged.

The mill quotation on plain material is 2.60c., Chicago, for indefinite delivery. We quote 2.84c. delivered Chicago for plain material for specific shipment. Jobbers quote 3.30c. for plain material out of warehouse.

Bars.—While new business in soft steel bars is still light as compared with what was done during the first quarter, it is showing signs of improvement. A mill east of here which found itself with some free tonnage as the result of the holding up of shipments, experienced no difficulty in disposing of nearly 2000 tons of bar size shapes at from 2.50c. to 2.55c., Pittsburgh. This material was for delivery within three weeks. Pressure for deliveries against standing orders is undiminished and steel consumption in all lines is unabated. Bookings in bar iron and hard steel bars are in fair volume, in the case of the former product being fully equal to production. The price situation on all classes of bars remains substantially unchanged.

Mill prices are: Mild steel bars, 2.50c., Chicago, for indefinite delivery and 2.74c., delivered Chicago, for specific shipments; common bar iron, 2.60c., Chicago; rail steel, 2.30c., Chicago mill.

Jobbers quote 3.20c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 4.50c. for rounds and 5.05c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 3.15c. base; hoops, 4.55c.; bands, 3.95c.

Wire Products.—Having followed a policy of taking new business sparingly for a considerable period, the leading interest has succeeded in reducing its obligations measurably and is now in a somewhat freer position. After a brief lull in nail demand, specifications have grown heavier. Demand for wire by manufacturing users is brisk. For mill prices, see finished iron and steel, f.o.b. Pittsburgh, page 1598.

We quote warehouse prices f.o.b. Chicago; No. 6 to No. 9 bright basic wire, \$3.90 per 100 lb.; extra for black annealed wire, 15c. per 100 lb.; common wire nails, \$3.95 per 100 lb.; cement coated nails, \$3.40 per keg.

Cast-Iron Pipe.—The market is steady in view of continued municipal lettings and the large amount of pending business. Private companies have also been buying liberally, this being particularly true of industrial plants laying their own water lines. Saginaw, Mich., has let 100 tons to the National Cast Iron Pipe Co. The same company has been awarded 150 tons by Michigan City, Ind., and will supply a general contractor with 200 tons for Traer, Iowa. The United

States Cast Iron Pipe Co. will furnish 250 tons for La Crosse, Wis.

We quote per net ton, f.o.b. Chicago, as follows:
Water pipe, 4-in., \$64.20; 6-in. to 12-in., \$60.20;
above 12-in., \$58.20 to \$59.20; class A and gas pipe,
\$5 extra.

Bolts and Nuts.—Specifications are light and new business is small. Although some third quarter contracts have been closed, nothing resembling a buying movement for that period has developed. Bolt and nut makers are still in a fairly comfortable position, but a few weeks more of restricted buying would find them in need of new business. Discounts appear to be steady at the March 1 level.

Jobbers quote structural rivets, 4c.; boiler rivets, 4.10c.; machine bolts up to $\frac{3}{4}$ x 4 in., 45 and 5 per cent off; larger sizes, 45 and 5 off; carriage bolts up to $\frac{3}{4}$ x 6 in., 40 and 5 off; larger sizes, 40 and 5 off; hot pressed nuts, squares and hexagons, tapped, \$2.50 off; blank nuts, \$2.50 off; coach or lag screws, gimlet points, square heads, 50 and 5 per cent off.

Sheets.—All mills are now adhering to the prices announced by the Steel Corporation subsidiary some time ago. Demand is not entirely lacking, although materially less than during the first quarter. Inquiries for black are fewer than for blue annealed and galvanized, but recent reports of a \$2 concession on black sheets appear to have no foundation in fact, at least so far as this district is concerned.

Mill quotations are 3.85c. for No. 28 black, 3c. for No. 10 blue annealed and 5c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote, f.o.b. Chicago, 4.35c. for blue annealed, 5.20c. for black and 6.35c. for galvanized.

Reinforcing Bars.—In the face of widely circulated reports of curtailment in building activity, concrete bar lettings are heavy, the total for the week being 4165 tons. At the same time, a number of good-sized inquiries have been added to the pending list. In anticipation of the broadly advertised slump in building, some bar dealers have been selling a little more freely. The slump, however, has not yet come and distributors find it as difficult as ever to obtain steel to cover their orders. Recent awards include:

J. R. Watkins Co., Winona, Minn., warehouse at Newark, N. J., 800 tons to Joseph T. Ryerson & Son.

Illinois Electric Co. power-house, Peoria, Ill., 700 tons to Kalman Steel Co.

Northwestern States Portland Cement Co. plant, Mason City, Iowa, 435 tons to Joseph T. Ryerson & Son.

Schools, Minneapolis, Minn., 260 tons to Concrete Steel Co.

Piper Hotel, Madison, Wis., 200 tons to Kalman Steel Co.

Illinois State highway work, 200 tons to Truseon Steel Co.

Stadium for Park Board, Terre Haute, Ind., 250 tons to Franklin Steel Co.

Illinois State highway work, 120 tons to Concrete Steel Co.

Gill Garage, Madison, Wis., 100 tons to Corrugated Bar Co.

Wisconsin road work, 100 tons to Kalman Steel Co.

Violet Street department store addition, Edward Schuster & Co., Milwaukee, 600 tons to Concrete Engineering Co.

Hotel for Benton Harbor (Mich.) Hotel Co., 175 tons to R. S. Hill, Milwaukee.

Law Street viaduct at Appleton, Wis., 125 tons to R. S. Hill, Milwaukee.

Garage for Gill Bros. at Madison, Wis., 100 tons to Corrugated Bar Co.

Memorial Auditorium, Racine, Wis., 100 tons to Kalman Steel Co.

Pending business includes:

Bridge, Belle Plaine, Kan., 250 tons, bids to be taken May 29.

Dow Warehouse, St. Paul, Minn., revived, 250 tons.

Smith, Bridgeman & Co. store building, Flint, Mich., 225 tons.

Old Material.—A large steel works has purchased 20,000 tons of heavy melting for June and July delivery at \$19 delivered. Outside of this order there has been very little buying by consumers and the market, which still shows a declining tendency, has been held in check largely by purchases by short interests of material to apply against their contracts expiring June 1. This buying by the dealers, of course, has been confined to material for prompt shipment and has brought comparatively high prices. Heavy melting, for example, has been bought at \$19.50 and only recently as high as \$20 was offered. This influence will be removed, however, with the expiration of the month, and few observers are willing to hazard a guess as to what course the market will take in June. The weak-

ness of scrap in other centers cannot be overlooked and it is pointed out that heavy melting at \$22, Pittsburgh, is closer to the Chicago market than is usually the case. Railroad offerings include the Pennsylvania, Southwestern Region, 7400 tons; the Wabash, 600 tons; the Chicago & Alton, 400 tons, and the Big Four, a blank list.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

| Per Gross Ton | |
|--------------------------------------|--------------------|
| Iron rails | \$23.50 to \$24.00 |
| Cast iron car wheels | 22.50 to 23.00 |
| Relaying rails, 56 and 60 lb. | 28.50 to 29.50 |
| Relaying rails, 65 lb. and heavier | 32.00 to 35.00 |
| Rolled or forged steel car wheels | 25.00 to 25.50 |
| Rails for rolling | 21.00 to 21.50 |
| Steel rails, less than 3 ft. | 22.00 to 22.50 |
| Heavy melting steel | 19.00 to 19.50 |
| Frogs, switches and guards cut apart | 19.00 to 19.50 |
| Shoveling steel | 18.75 to 19.25 |
| Drop forge flashings | 16.50 to 17.00 |
| Hydraulic compressed sheets | 17.50 to 18.00 |
| Axle turnings | 17.50 to 18.00 |

| Per Net Ton | |
|-----------------------------|----------------|
| Iron angle and splice bars | 23.00 to 23.50 |
| Steel angle bars | 19.00 to 19.50 |
| Iron arch bars and transoms | 23.00 to 23.50 |
| Iron car axles | 28.00 to 28.50 |
| Steel car axles | 21.50 to 22.00 |
| No. 1 busheling | 16.00 to 16.50 |
| No. 2 busheling | 12.00 to 12.50 |
| Cut forge | 17.00 to 17.50 |
| Pipes and flues | 13.00 to 13.50 |
| No. 1 railroad wrought | 16.50 to 17.00 |
| No. 2 railroad wrought | 17.00 to 17.50 |
| Steel knuckles and couplers | 22.00 to 22.50 |
| Coil springs | 23.00 to 23.50 |
| No. 1 machinery cast | 22.50 to 23.00 |
| No. 1 railroad cast | 20.50 to 21.00 |
| No. 1 agricultural cast | 20.50 to 21.00 |
| Low phos. punchings | 19.00 to 19.50 |
| Locomotive tires, smooth | 19.50 to 20.00 |
| Machine shop turnings | 12.50 to 13.00 |
| Cast borings | 14.00 to 14.50 |
| Short shoveling turnings | 14.00 to 14.50 |
| Stove plate | 15.75 to 16.25 |
| Grate bars | 15.75 to 16.25 |
| Brake shoes | 16.00 to 16.50 |
| Railroad malleable | 22.00 to 22.50 |
| Agricultural malleable | 21.50 to 22.00 |

Detroit Scrap Market

DETROIT, May 26.—The strength of the present market on old material in this district will probably be determined in the letting of approximately 4000 tons of turnings, flashings, borings, regular hydraulic compressed, heavy melting and shoveling steel, by one of the largest producers. This tonnage is for June delivery and is offered on a competitive basis. Melters are buying for current needs only and a condition similar to the end of the fourth quarter of 1922 is apparent in the attitude of buyers in this district.

The following prices are quoted on a gross ton basis f.o.b. cars producers' yards excepting stove plate, automobile cast and No. 1 machinery cast, which are quoted on a net ton basis:

| | |
|-----------------------|--------------------|
| Heavy melting steel | \$19.00 to \$20.00 |
| Shoveling steel | 19.00 to 20.00 |
| No. 1 machinery cast | 24.00 to 25.00 |
| Cast borings | 15.00 to 16.00 |
| Automobile cast scrap | 25.00 to 27.00 |
| Stove plate | 19.50 to 20.50 |
| Hydraulic compressed | 18.00 to 19.00 |
| Turnings | 16.00 to 17.00 |
| Flashings | 16.00 to 17.00 |

Arthur M. Loeb, president California Equipment & Supply Co., and one of the original purchasers of Buttress & McClellan and Collins & Webb, has sold out his interest to associate himself with the Allied Machinery Corporation of California, with headquarters at 465 East Third Street, Los Angeles. For many years he has followed the construction line in South and Central America, and for 12 years was engaged in the steel and machinery business, selling new and used heavy equipment. The Allied Machinery Corporation, in conjunction with its present activities in the domestic market, will develop the export field. Its eastern export office is in New York. The firm also specializes in inspection and appraisal for Pacific Coast ports.

New York

Reselling of Iron at Large Concessions—Mills Easily Filling Steel Schedules

NEW YORK, May 28.—The lifting of the embargo by the New Haven Railroad has made it possible to make a large number of shipments to New England; in fact, the delivery of pig iron has been so rapid that a few requests for suspension have been received.

Pig Iron.—Very little reselling of pig iron has been done from New York offices, but it is known that at least one large buyer having plants in different parts of the country has purchased several lots of Southern iron, ranging from 1000 to 1500 tons, on a basis of \$25, Birmingham, for No. 2 plain, and that this company has had opportunities to buy similar lots of southern Ohio iron at \$27.50, furnace. A resale of 400 tons of foundry iron has been made on a basis of \$29, western Pennsylvania furnace, but most foundries in the East are able to melt the iron almost as fast as it is received. The delivery of some tonnages will, however, extend beyond the period for which the iron was bought. The principal inquiries pending are as follows: Gould Coupler Co., 1000 tons; Worthington Pump & Machinery Corporation, 500 tons; Ingersoll-Rand Co., 300 tons, and American Hardware Co., 200 to 400 tons, the last named being for July-August delivery. The only inquiry of importance for third quarter is 500 to 600 tons by a company buying for its Western plant. The price situation shows no change.

We quote delivered in the New York district as follows, having added to furnace prices \$2.27 freight from eastern Pennsylvania, \$4.91 from Buffalo and \$5.44 from Virginia:

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|--|------------------|
| East. Pa. No. 1 fdy., sil. 2.75 to 3.25 | \$35.27 |
| East. Pa. No. 2X fdy., sil. 2.25 to 2.75 | 34.27 |
| East. Pa. No. 2 fdy., sil. 1.75 to 2.25 | 33.27 |
| Buffalo, sil. 1.75 to 2.25 | \$33.41 to 33.91 |
| No. 2X Virginia, sil. 2.25 to 2.75 | 34.44 to 34.94 |
| No. 2 Virginia, sil. 1.75 to 2.25 | 33.44 to 33.94 |

Ferroalloys.—There is very little change in ferromanganese demand. Occasional sales of carload and small lots are made for early delivery at \$130, seaboard, and for last half shipment at \$125, seaboard. We note a sale of 300 tons for last quarter at \$125. A rumor that the alloy can be bought for last quarter at \$120 has not been confirmed. The spiegeleisen market is only moderately active at unchanged prices. For prompt and early delivery the alloy is scarce and bringing as high as \$55. There have been no developments in the manganese ore market. The lowest price for 50 per cent ferrosilicon at which business is noted as having been done is \$95, delivered, although it is stated at \$92.50 per ton, can be done in some quarters.

Cast-Iron Pipe.—Demand continues fair and prices firm. Makers are well filled for several months ahead and deliveries are extended. Bids were opened May 29 by Marblehead, Mass., on 3180 ft. of 16-in., 216 ft. of 14-in., 660 ft. of 6-in. and 420 ft. of 4-in. water pipe. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, \$58.50; 4-in. and 5-in., \$63; 3-in., \$68.80, with \$4 additional for Class A and gas pipe. The soil pipe market continues quiet and unchanged. We quote discounts of both Southern and Northern makers, delivered New York, as follows: 2 to 6-in. standard, 13 to 15% per cent off list; heavy, 23 to 25% per cent off list.

Warehouse Business.—On most items sold out of stock, demand is lighter. Some small quantities of structural material are still moving and orders for plates, although somewhat diminished, are still heavy. Open-hearth spring steel is still in good demand. Warehouses handling steel pipe report an active business in all sizes, although there has been a slight decrease in orders for pipe going into new buildings. The market on black and galvanized sheets continues weak with numerous reports of shading to obtain business and most of the larger warehouses handling sheets lowering prices on occasion to meet the competition. A fair estimate of today's market on black and galvanized

sheets is 5c. to 5.25c. per lb. base on black and 6c. to 6.25c. per lb. base on galvanized, with reports of sales having been made at as low as 4.80c. and 5.80c. per lb. on black and galvanized respectively. We quote prices on page 1644.

Finished Iron and Steel.—In the face of the reduced amount of buying, sentiment has definitely improved both among buyers and sellers, with indications that a round volume of business will develop as the mills need it. Mill representatives report little difficulty in securing orders to round out definite rolling schedules, a fact taken as proving that demand is latent. Quite a little new business is expected from the railroads, largely in the way of track maintenance and repair, including frogs and switches, but of all buyers, the railroads seem at the moment to be the most skeptical that the present levels can be maintained. They are postponing awards and in some cases are expected to re-advertise work on which bids were received only a few weeks ago. In fabricated steel work private enterprises are still noteworthy. Among general buyers more contracting of the heavy tonnage products is noted for third quarter shipments at current prices. The strength of the market is shown by the purchase of 1000 tons of concrete reinforcing bars at 2.45c., Pittsburgh basis, paid to secure relatively early shipment.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.74c. to 2.84c.; plates and structural shapes, 2.84c.; bar iron, 2.84c.

Coal and Coke.—Although the export movement of coke was virtually ended several weeks ago, coal continues to be exported and is going to many foreign countries, including the Mediterranean countries, with some shipments to South America. The tonnage is not very large. The coke price range is from \$6 to \$6.50 on foundry grades and \$5.50 to \$6 on furnace for prompt shipment, while \$6 seems to be the contract price for furnace, although an eastern Pennsylvania company is reported to have contracted as low as \$5.85 per ton. The price of by-product coke is \$12.34 to \$12.41, Newark and Jersey City points.

Old Material.—Prices on practically all grades still exhibit a downward tendency, No. 1 heavy melting steel showing a further decline this week of 50c. per ton. A fair range of buying prices, New York, on heavy melting steel based upon \$19 being paid delivered eastern Pennsylvania and \$18 per ton for railroad quality delivered Bethlehem, is \$15 to \$15.50 per ton for yard steel and \$15.25 to \$15.75 per ton for railroad quality, or equivalent. Shipments of heavy melting steel are still going forward to Conshohocken, Coatesville, Pa., and Claymont, Del. The small tonnage of pipe that is being shipped is going forward to a consumer at Milton, Pa., but demand is light and specification pipe is not quotable in New York at better than \$12 to \$12.50 per ton. Stove plate is quiet, with very little being shipped to New Jersey foundries. Shipments of stove plate are being made to Harrisburg, Pa., for which delivery dealers are paying up to \$18.25 per ton and for delivery to Phoenixville, Pa., \$18.50 per ton is being paid. On most grades dealers are reluctant to contract heavily at present prices, anticipating an upward movement.

Buying prices per gross ton, New York, follow:

| | |
|---|--------------------|
| Heavy melting steel, yard | \$15.00 to \$15.50 |
| Steel rails, short lengths, or equivalent | 15.25 to 15.75 |
| Rails for rolling | 19.00 to 20.00 |
| Relaying rails, nominal | 26.00 to 27.00 |
| Steel car axles | 23.00 to 24.00 |
| Iron car axles | 25.00 to 26.00 |
| No. 1 railroad wrought | 17.00 to 18.00 |
| Wrought iron track | 16.00 to 16.50 |
| Forge fire | 14.00 to 14.50 |
| No. 1 yard wrought, long | 15.50 to 16.00 |
| Cast borings (clean) | 14.00 to 14.50 |
| Machine-shop turnings | 14.00 to 14.50 |
| Mixed borings and turnings | 13.00 to 13.50 |
| Iron and steel pipe (1 in. diam., not under 2 ft. long) | 12.00 to 12.50 |
| Stove plate | 14.00 to 15.00 |
| Locomotive grate bars | 14.00 to 15.00 |
| Malleable cast (railroad) | 20.00 to 21.00 |
| Cast-iron car wheels | 22.00 to 23.00 |

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

| | |
|---|--------------------|
| No. 1 machinery cast | \$22.00 to \$23.00 |
| No. 1 heavy cast (columns, building materials, etc.), cupola size | 21.00 to 22.00 |
| No. 1 heavy cast, not cupola size | 19.00 to 20.00 |
| No. 2 cast (radiators, cast boilers, etc.) | 17.00 to 18.00 |

St. Louis

Customers Quietly Sounding Market—Melt Has Decreased Slightly

ST. LOUIS, May 29.—Save for signs of interest among melters for their third quarter requirements, there has been no change worthy of note in the pig iron situation. Actual sales are rare, and confined to car lots, the aggregate being under 1000 tons. The selling agencies, however, report that their customers are quietly feeling out the market, and there are other indications that a buying movement is not far in the future. While the melt has fallen about 10 to 15 per cent under the high point in March, it is still of large proportions, and most of the industries have orders which will insure the present rate of activities through the third quarter. Their stocks of raw material are not large, and it is only a matter of time before they must recoup. Stove plants continue active, operating at fully 80 per cent of capacity, and the job plants are running at about that average. Prices are notably steady, No. 2 Southern at \$27 and Northern of the same grade at \$32.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices \$2.16 freight from Chicago, \$3.28 from Birmingham (rail and water), \$5.17 from Birmingham, all rail, and 81 cents average switching charge from Granite City:

| | |
|--|---------|
| Northern fdy., sil. 1.75 to 2.25..... | \$34.16 |
| Northern malleable, sil. 1.75 to 2.25..... | 34.16 |
| Basic | 34.16 |
| Southern fdy., sil. 1.75 to 2.25..... | 32.17 |

Finished Iron and Steel.—Some inquiries have appeared for soft steel bars for third quarter delivery, but the tonnages specified thus far are not large. The demand for boiler and tank plates continues excellent, with all the boiler works in the district working at or near capacity. There is a better tone to railroad buying than earlier in the month. Some hurry up orders have been placed for track supplies to apply on repairs necessitated by the recent washouts in Arkansas, Oklahoma and Southern Missouri. An Arkansas interest is asking prices on 1200 tons of reinforcing concrete bars for delivery through September. Warehousemen report a steady and satisfactory movement of their goods, with prices steady throughout the entire list. Nails and wiregoods generally continue scarce. Orders for grey castings have slowed down during the past three weeks, but all plants have fair backlogs.

For stock out of warehouse we quote: Soft steel bars, 3.35c. per lb.; iron bars, 3.35c.; structural shapes, 3.45c.; tank plates, 3.45c.; No. 10 blue annealed sheets, 4.45c.; No. 28 black sheets, cold rolled, one pass, 5.20c.; cold drawn rounds, shafting and screw stock, 4.45c.; structural rivets, 4.15c.; boiler rivets, 4.25c.; tank rivets, $\frac{3}{4}$ in. and smaller, 50-5 per cent off list; machine bolts, 45-5 per cent; carriage bolts, 40-5 per cent; lag screws, 50-5 per cent; hot pressed nuts, square or hexagon blank, \$2.50; and tapped, \$2.50 off list.

Coke.—Offerings of coke by Eastern ovens have dwindled materially since the middle of May, and the trend of prices is slightly upward. Deliveries are coming through well, however, and melters generally are comfortable as to supplies for the next few weeks. There is a fair inquiry from the West and Southwest for metallurgical coke, the largest single tonnage being from a Kansas melter for 6000 tons, for delivery through the rest of the year. Industrial users continue to make their wants known, with the water gas interests particularly active. Local by-product producers report a good demand from domestic sources, with storage by householders considerably larger than at the corresponding period a year ago. Southern shipments have fallen off, and less coke is being offered by Alabama ovens. Prices on all grades and sizes are steady.

Old Material.—Absolutely no change for the better has taken place in the scrap iron and steel interest. The industries are not purchasing a pound, and indications are that they will not do so before well into July. The melt continues large, but so, also, are stock piles and the volume of material under contract. The only exchanges heard of were between dealers, some of whom are covering on short contracts. There were further downward price revisions in dealers' lists, but

quoted figures are largely nominal, there having been no transactions upon which to predicate accurate prices. The movement from the country has subsided, and railroads have stopped offering in volume. The only proffer by a carrier was 500 tons of light sheet and two cars of locomotive tires by the Wabash. Steel and rolling mill grades are particularly apathetic.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

| Per Gross Ton | |
|--|--------------------|
| Iron rails | \$20.00 to \$20.50 |
| Rails for rolling..... | 20.00 to 20.50 |
| Steel rails, less than 3 ft..... | 22.00 to 22.50 |
| Relaying rails, standard section... | 37.50 to 39.00 |
| Cast iron car wheels..... | 22.50 to 23.00 |
| Heavy melting steel..... | 18.50 to 19.00 |
| Heavy shoveling steel..... | 18.00 to 18.50 |
| Frogs, switches and guards cut apart | 19.00 to 19.50 |

| Per Net Ton | |
|----------------------------------|----------------|
| Heavy axles and tire turnings... | 14.25 to 14.75 |
| Steel angle bars | 18.00 to 18.50 |
| Iron car axles | 26.75 to 27.25 |
| Steel car axles | 21.50 to 22.00 |
| Wrought iron bars and transoms | 21.50 to 22.00 |
| No. 1 railroad wrought..... | 16.50 to 17.00 |
| No. 2 railroad wrought..... | 16.00 to 16.50 |
| Railroad springs | 22.00 to 22.50 |
| Steel couplers and knuckles..... | 22.25 to 22.75 |
| Cast iron borings..... | 13.50 to 14.00 |
| No. 1 busheling..... | 16.25 to 17.00 |
| No. 1 railroad cast..... | 21.00 to 21.50 |
| No. 1 machinery cast..... | 22.00 to 22.50 |
| Railroad malleable | 20.00 to 20.50 |
| Machine shop turnings..... | 12.50 to 13.00 |

Buffalo

Price Fairly Well Maintained on Pig Iron—General Situation Quiet

BUFFALO, May 29.—One furnace has quoted \$29 for silicon 1.75 to 2.25 on several recent inquiries, but in the main, the firm tone of this market is unchanged. Four of the five producers are willing to take new business, but three hold firm to \$29.50 on the theory that price concessions would not bring any resumption of buying. The fact that a number of large building operations have been abandoned or deferred has communicated itself to the basic situation and salesmen encounter something of a discouraging note on the part of melters. The largest individual inquiry is for 200 tons and the others are mostly carload lots with an occasional 100-ton lot. There is no change in differentials.

We quote f.o.b. per gross ton Buffalo as follows:

| | |
|--|--------------------|
| No. 1 foundry, 2.75 to 3.25 sil. | \$30.00 to \$30.50 |
| No. 2X foundry, 2.25 to 2.75 sil. | 29.50 to 30.00 |
| No. 2 plain, 1.75 to 2.25 sil. | 29.00 to 29.50 |
| Basic | 28.00 to 29.00 |
| Malleable | 29.00 to 30.00 |
| Lake Superior charcoal..... | 37.28 |

Finished Iron and Steel.—One mill finds evidences of a more active nature and business developed in a small way from bar buyers not connected with the automotive trade. Generally the situation is quiet but the quietness is accepted as of a stabilizing character rather than depressing. Certain commodities such as pipe, wire and tin plate are in greater demand than has marked earlier calls, though demand for these has been brisk for a long time. Bar prices range from 2.40c. to 2.50c. and shapes and plates are nearly uniform at 2.50c. A local mill has been asking 2.50c. for bars, but in competition has made 2.40c. There is very little new business coming out for use in automobile work and what auto work is now on schedules is being rushed through. Tin plate has been entirely sold up for third quarter and fourth quarter books have not been opened. Railroad work mostly concerned with car and locomotive repairs has developed some business involving bars, shapes and plates. Galvanized sheets are more active than black; the prevailing price on black is 3.85c. and 5c. on galvanized.

Warehouse Business.—The fact that mills are in better position to make deliveries has made the demands on warehouses less insistent. While there is no slump, demand is considerably quieter and there is little

change expected for the next 60 days. There has been a particularly heavy run on structural material which is gradually abating.

We quote warehouse prices, Buffalo, as follows:
Structural shapes, 3.65c.; plates, 3.65c.; soft steel bars, 3.55c.; hoops, 4.65c.; bands, 4.35c.; blue annealed sheets, No. 10 gage, 4.30c.; galvanized steel sheets, No. 28 gage, 6.10c.; black sheets, No. 28 gage, 5.10c.; cold rolled round shafting, 4.45c.

Old Material.—Dealers are very active in filling existing contracts and are making special efforts in view of an unusual number of cancellations. Transactions between dealers have had the effect of keeping prices up. While shipping is brisk, labor shortages and embargoes have interfered with deliveries to some extent.

| | |
|--------------------------------|--------------------|
| Heavy melting steel..... | \$20.50 to \$21.50 |
| Low phos., 0.04 and under..... | 25.00 to 26.00 |
| No. 1 railroad wrought..... | 19.00 to 20.00 |
| Car wheels..... | 21.00 to 22.00 |
| Machine shop turnings..... | 16.00 to 17.00 |
| Cast iron borings..... | 19.00 to 20.00 |
| No. 1 busheling..... | 18.00 to 19.00 |
| Stove plate..... | 18.00 to 19.00 |
| Grate bars..... | 17.00 to 18.00 |
| Bundled sheet stampings..... | 15.00 to 16.00 |
| No. 1 machinery cast..... | 23.00 to 24.00 |
| Hydraulic compressed..... | 18.50 to 19.50 |
| Railroad malleable..... | 24.00 to 25.00 |

Boston

Continued Inactivity Fails to Develop New Weak Pig Iron Spots

BOSTON, May 29.—Continued inactivity failed to develop new weak spots in the pig iron market the past week. Virginia is still available at \$28, furnace base, with 50c. differentials, although some furnaces hold to \$29 for prompt and \$28.50 for third quarter delivery. Resale western Pennsylvania No. 2X is offered at \$28, furnace, or \$32.92 delivered, and regular furnace iron at \$29.50 base, or \$34.42 delivered. No deviation was noted the past week from \$29.50 base for Buffalo, and \$31 base for eastern Pennsylvania, although the former, in round tonnages, probably could be obtained at \$29. York State iron is not weaker, reports to the contrary. Sentiment among melters is mixed. Some are sounding out the market for third quarter iron with inquiries, which while not exceeding 500 tons are larger in the aggregate than a week ago. Where foundries are less active, and this is true in quite a few instances, they are not interested in iron at any price.

We quote delivered prices on the basis of the latest reported sales as follows, having added \$3.65 freight from eastern Pennsylvania, \$4.91 from Buffalo, \$5.92 from Virginia, and \$9.60 from Alabama:

| | |
|-------------------------------------|--------------------|
| East. Penn., sil. 2.25 to 2.75..... | \$35.15 to \$36.65 |
| East. Penn., sil. 1.75 to 2.25..... | 34.65 |
| Buffalo, sil. 2.25 to 2.75..... | 34.41 to 35.41 |
| Buffalo, sil. 1.75 to 2.25..... | 33.91 to 34.41 |
| Virginia, sil. 2.25 to 2.75..... | 33.92 to 35.42 |
| Virginia, sil. 1.75 to 2.25..... | 33.92 to 34.92 |
| Alabama, sil. 2.25 to 2.75..... | 38.10 |
| Alabama, sil. 1.75 to 2.25..... | 37.60 |

Coke.—New England by-product foundry coke producers report slightly freer requisitions against contracts by foundries that have decided to stock fuel a little more heavily. The movement of coke, however, is well below that of a month and two months back. Both the New England Coal & Coke Co. and the Providence Gas Co. quote foundry coke at \$15 a ton delivered within the \$3.10 freight zone. Additional sales of top grade Connellsville foundry coke at \$12.30 delivered or \$6.75 ovens are reported, but they are few and far between.

Old Material.—Prices continue to slip back under their own weight rather than to any pressure to force old material on the market. Buyers and sellers alike are indifferent, the tendency being to let things drift until a new demand develops. Mills continue to reject material shipped out of New England, and this fact has at least a sentimental influence on values here. Dealers, who a fortnight ago bought heavy melting steel at \$16 to \$16.50 on cars shipping point, have cut their bids 50c. a ton and secured limited tonnages. Machine shop turnings and mixed borings and turnings display even greater softness, car lots having been

bought recently at \$12.50 and \$12.75, which represents a drop of \$1.50 to \$1.75 within a few days. Bundled skeleton and forged scrap has been purchased at \$12.50 to \$13 on cars shipping point, or \$1 under last week's market. Railroad and yard wrought are easily 50c. a ton cheaper and difficult to move even on the new price basis.

The following prices are for gross ton lots delivered consuming points:

| | |
|---------------------------|--------------------|
| No. 1 machinery cast..... | \$25.00 to \$25.50 |
| No. 2 machinery cast..... | 23.00 to 23.50 |
| Stove plate..... | 19.00 to 19.50 |
| Railroad malleable..... | 26.00 to 26.50 |
| Street car wheels..... | 24.00 to 25.00 |

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

| | |
|---|--------------------|
| No. 1 heavy melting steel..... | \$15.50 to \$16.00 |
| No. 1 railroad wrought..... | 17.50 to 18.50 |
| No. 1 yard wrought..... | 15.50 to 16.50 |
| Wrought pipe (1 in. in diam., over 2 ft. long)..... | 12.50 to 13.00 |
| Machine shop turnings..... | 12.50 to 12.75 |
| Cast iron borings, rolling mill..... | 14.50 to 15.00 |
| Cast iron borings, chemical..... | 16.00 to 17.00 |
| Blast furnace borings and turnings..... | 12.50 to 12.75 |
| Forged scrap and bundled skeleton..... | 12.50 to 13.00 |
| Shafting..... | 19.50 to 20.00 |
| Street car axles..... | 19.50 to 20.00 |
| Rails for rolling..... | 18.00 to 18.50 |

Birmingham

Slight Increase of Inquiry for Pig Iron—Pipe Orders Accumulate

BIRMINGHAM, ALA., May 29.—Toward the close of last week, slight renewal of inquiry in St. Louis and Cincinnati territory with reference to Birmingham pig iron caused makers to sense the possibility of the early approach of a new buying movement. Otherwise it was the same uneventful week as the one preceding and was marked by lots from car loads to 250 tons for prompt delivery at the uniform base of \$27. Consumers continued to take and demand prompt delivery of all iron ordered, and stocks were going down from the minimum already established with production at maximum and probably a new high mark. Eighteen stacks are on merchant iron and ten on basic with one on charcoal. The latter iron is in fair demand, with the one furnace production well cared for at \$34. There is no change in general attitude either of maker or melter, and none seems at all disposed to hurry matters. No fourth quarter inquiry has developed. A significant feature is the fact that the largest merchant iron maker is behind in deliveries, showing the strong demand for contracted iron. Some makers look for the break to come toward end of this week.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

| | |
|------------------------------------|---------|
| Foundry, silicon 1.75 to 2.25..... | \$27.00 |
| Basic..... | 26.00 |
| Charcoal, warm blast..... | 34.00 |

Cast Iron Pipe.—Pressure pipe orders accumulate in spite of the swamped condition of works. The nominal base of \$49 is often increased by \$1 and \$2. Sanitary pipe is rather quiet, but the base remains firm at \$75 for standard. The feature of the week was the shipment of 20 tons of soil pipe to Manila via Mobile. Pacific Coast points took 5400 tons of pressure and sanitary pipe via Mobile and the canal.

Finishing Mills.—Following the shipment of 3000 tons of rails to Otaru, Japan, the Tennessee company last week shipped 4000 tons to Yokohama, Kobe, Dairen and Tsingtau, together with 1800 tons of sulphate of ammonia. The ship also carried heavy tonnage of splice bars, wire, bolts, nuts, nutlocks and channel steel, the cargo being the most varied yet leaving Mobile for the Orient. All steel mills are at capacity and behind on deliveries. Nails are especially belated.

Coal and Coke.—Coal production has again approached the new high mark of 400,000 tons a week. Coke is firm as ever at \$9 and \$10 for spot.

Old Material.—The week was a fairly active one in both steel and cast with quoted prices maintained.

Yards report outgo and income of stocks as well balanced. We quote per gross ton, f.o.b. Birmingham district furnaces as follows:

| | |
|---|--------------------|
| We quote per gross ton f.o.b. Birmingham district yards as follows: | |
| Old steel rails..... | \$18.00 to \$20.00 |
| No. 1 steel..... | 16.00 to 18.00 |
| No. 1 cast..... | 24.00 to 25.00 |
| Car wheels..... | 24.00 to 25.00 |
| Tramcar wheels..... | 23.00 to 24.00 |
| Stove plate..... | 18.00 to 19.00 |
| Cast iron borings..... | 12.00 to 13.00 |
| Machine shop turnings..... | 12.00 to 13.00 |

Philadelphia

Markets All Quiet, but Prices Except for Scrap Are Unchanged

PHILADELPHIA, May 29.—There is an absence of activity in all branches of the iron and steel industry. Steel mills report that consumers are taking all of the material that is shipped to them on contracts, there having been few, if any hold-ups, but the volume of new buying is very light and consists mainly of carload lots for quick shipment. The pig iron trade of eastern Pennsylvania continues to pursue a policy of watchful waiting. Meanwhile furnaces in nearby districts are encroaching on this territory with offerings somewhat lower in price than the furnaces in this district are willing to quote. Pig iron business is likewise made up mostly of carload lots and orders are not numerous. Nearly all grades of scrap show further declines and there is little buying.

Pig Iron.—It is expected that within a week or so a large Eastern consumer of basic will cover for July requirements, about 20,000 tons, and the prices at which this business is closed will determine to a certain extent the concessions, if any, which furnaces are willing to make to the buyer for third quarter contracts both on steel-making and foundry grades. Up to this time the eastern Pennsylvania furnaces have adhered strictly to a minimum of \$31 for No. 2 plain, \$32 for No. 2X and \$33 for No. 1X, f.o.b. furnace, with basic available at \$30, delivered, but sellers are watching with some apprehension the encroachments of so-called outside furnaces. While these outside furnaces are at a disadvantage in selling in Philadelphia or vicinity, they have been able to take some business at points in northern Pennsylvania and New York State at delivered prices which eastern Pennsylvania furnaces could not meet without departing from the \$31 base price. It is reported that furnaces in the central and western part of Pennsylvania have quoted prices at least \$2 a ton lower at the furnace than those named by eastern Pennsylvania furnaces. In foundry iron there is practically no inquiry for third quarter, a request for prices on 500 tons of malleable being an outstanding exception. It is stated here that one or two Virginia furnaces have shaded the \$29 base by 50c. per ton. The Alleghany Ore & Iron Co. at Buena Vista, Va., advises that its furnace there is not out of blast, as reported last week, but is operating at reduced blast while repairs are being made to the high-pressure blowing engine.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to \$1.64 per gross ton:

| | |
|--|--------------------|
| East. Pa. No. 2 plain, 1.75 to 2.25 sil. | \$31.76 to \$32.64 |
| East. Pa. No. 2X, 2.25 to 2.75 sil. | 32.76 to 33.64 |
| East. Pa. No. 1X..... | 33.76 to 34.64 |
| Virginia No. 2 plain, 1.75 to 2.25 sil. | 34.17 |
| Virginia No. 2X, 2.25 to 2.75 sil. | 35.17 |
| Basic delivered eastern Pa..... | 30.00 to 31.00 |
| Gray forge..... | 29.50 to 30.00 |
| Malleable..... | 33.14 to 33.64 |
| Standard low phos. (f.o.b. furnace)..... | 30.00 to 35.00 |
| Copper bearing low phos. (f.o.b. furnace)..... | 33.00 |

Foreign Pig Iron

| | |
|--|------------------|
| All prices f.o.b. cars Philadelphia, duty paid. | |
| Continental foundry, 1.80 to 2.50 sil. | \$30.50 |
| Continental foundry, 2.50 to 3 sil. | 31.50 |
| Low phos. copper free, guar. not over 0.035 per cent phos..... | \$35.00 to 36.00 |
| Continental, phos. 1.50; sil. 2 to 3. | 30.00 to 31.00 |

Coke.—There has been no general contracting for blast furnace coke for third quarter by furnaces in this district, but Connellsville operators are freely offering to cover the furnaces at \$6, Connellsville. Standard furnace coke for prompt shipment is available at \$5.50. Foundry coke is quoted at \$6.50 to \$7.

Ferroalloys.—Prices of ferromanganese remain unchanged at \$125 for future and \$130 for prompt, either seaboard or furnace base. Spiegeleisen is quoted in carload lots at \$50, furnace, for early shipment and at lower prices for larger quantities, while 50 per cent ferrosilicon is still held at \$95.

Semi-Finished Steel.—Quotations are unchanged at \$45, Pittsburgh, for open-hearth rerolling billets and \$55 for forging billets.

Plates.—Eastern plate mills are still getting 2.60c. to 2.65c., Pittsburgh, on small lots for early shipment, while for third quarter 2.50c., Pittsburgh, is generally quoted. The Philadelphia & Reading is reported to have closed for a part of the 1500 tons of car plates it recently inquired for. There is pressure from the railroads to hasten shipments of car steel, but other consumers are being well taken care of; yet all that is being received is evidently going into immediate use, as there are no requests to hold back shipments.

Structural Steel.—Inquiries are confined to small lots, usually under 100 tons, for repair work or additions, there being very little new building work of an important character in the market. Shapes are available for July shipment at 2.50c., Pittsburgh, while for immediate rolling some of the Eastern mills are still getting as high as 2.75c., mill.

Bars.—On attractive lots of bar iron some of the Eastern mills are meeting the price quoted on steel bars, namely 2.40c., Pittsburgh, though on small lots there are still quotations of 2.50c. Business in both steel and iron bars is of small volume.

Sheets.—There is little more competition for orders for sheets, except possibly galvanized, and prices have generally come down to the level of the American Sheet & Tin Plate Co. prices, premiums no longer being easily obtainable.

Bolts, Nuts and Rivets.—Prices quoted on bolts, nuts and rivets for second quarter will be continued into third quarter and consumers and jobbers will now be able to make contracts. These prices are on the basis of 50 and 10 per cent off list for large machine bolts.

Old Material.—The scrap market has taken on no strength. On the contrary, prices show further declines within the week on a limited volume of trading. No. 1 heavy melting steel is unchanged at \$19 to \$20, delivered, but in other grades prices are from 50c. to \$1.50 per ton lower than those of a week ago.

We quote for delivery at consuming points in this district as follows:

| | |
|---|--------------------|
| No. 1 heavy melting steel..... | \$19.00 to \$20.00 |
| Scrap rails..... | 19.00 to 20.00 |
| Steel rails for rolling..... | 22.00 to 23.00 |
| No. 1 low phos., heavy 0.04 and under..... | 26.00 to 27.00 |
| Cast iron car wheels..... | 23.00 to 24.00 |
| No. 1 railroad wrought..... | 23.00 to 24.00 |
| No. 1 yard wrought..... | 20.00 to 21.00 |
| No. 1 forge fire..... | 18.00 to 18.50 |
| Bundled sheets (for steel works)..... | 17.00 to 17.50 |
| No. 1 busheling..... | 19.00 to 20.00 |
| Mixed borings and turnings (for blast furnace use)..... | 17.00 to 17.50 |
| Machine shop turnings (for steel works use)..... | 16.50 to 17.00 |
| Machine shop turnings (for rolling mill use)..... | 17.00 to 17.50 |
| Heavy axle turnings (or equivalent)..... | 18.50 to 19.50 |
| Cast borings (for steel works and rolling mills)..... | 17.50 to 18.00 |
| Cast borings (for chemical plants)..... | 21.00 to 22.00 |
| No. 1 cast..... | 23.50 to 24.50 |
| Heavy breakable cast (for steel plants)..... | 20.00 to 21.00 |
| Railroad grate bars..... | 18.50 to 19.00 |
| Stove plate (for steel plant use)..... | 18.00 to 18.50 |
| Railroad malleable..... | 22.00 to 24.00 |
| Wrought iron and soft steel pipes and tubes (new specifications)..... | 15.00 to 16.00 |
| Shafting..... | 24.00 to 26.00 |
| Steel axles..... | 24.00 to 26.00 |

Warehouse Business.—Sales of steel out of jobbers' stocks picked up somewhat last week over the week

previous. Prices are unchanged and for local delivery are as follows:

Soft steel bars and small shapes, 3.55c.; iron bars (except bands), 3.55c.; round edge iron, 3.75c.; round edge steel, iron finished, $1\frac{1}{2}$ x $\frac{1}{2}$ in., 3.75c.; round edge steel planished, 4.55c.; tank steel plates, $\frac{1}{4}$ in. and heavier, 3.65c.; tank steel plates, $\frac{3}{8}$ in., 3.95c.; blue annealed steel sheets, No. 10 gage, 4.25c.; black sheets, No. 28 gage, 5.15c.; galvanized sheets, No. 28 gage, 6.25c.; square twisted and deformed steel bars, 3.65c.; structural shapes, 3.65c.; diamond pattern plates, $\frac{1}{4}$ -in., 5.40c.; $\frac{3}{8}$ -in., 5.60c.; spring steel, 5c.; round cold-rolled steel, 4.35c.; squares and hexagons, cold-rolled steel, 4.85c.; steel hoops, 1 in. and wider, No. 20 gage and heavier, 4.75c.; narrower than 1 in., all gages, 5.25c.; steel bands, No. 12 gage to $\frac{3}{8}$ -in., inclusive, 4.35c.; rails, 3.55c.; tool steel, 8.50c.; Norway iron, 7c.

Cincinnati

Southern Resale Iron Sold at \$25—Ohio Iron Develops Weakness

CINCINNATI, May 29.—Further weakness developed in the pig iron market last week. A large melter of iron with furnaces in several States has purchased several lots of Southern resale iron at \$25, Birmingham, for No. 2. On Wednesday a sale of 500 tons of southern Ohio iron was made to a Kentucky melter at \$29, furnace, for immediate shipment. On Friday a sale of 1000 tons of malleable for June and July shipment was made at \$28.75, Ironton, and today a sale of 750 tons for immediate shipment was reported at a price said to be equal to \$28.50, Ironton basis. The market is quotable at \$28.50 to \$29, Ironton basis. A Tennessee furnace on Wednesday offered a round tonnage of iron ranging from 2.50 silicon up, at \$25.50. While this iron runs slightly higher in phosphorus than other Southern irons, it is regarded by some melters as a standard iron. Some sales have been made at this price. Some Southern furnaces are reported to be giving away silicon differentials, particularly on the higher grades. It is doubtful, however, whether iron running 1.75 to 2.25 silicon can be had direct from furnace at less than \$27. There is little inquiry for third quarter iron, and what little business is being done is for prompt shipment. This naturally results in keen competition for orders, as a number of furnaces in the southern Ohio district are piling a good percentage of their make. There is no activity in Bessemer, basic, or silveries.

Based on freight rates of \$4.05 from Birmingham and \$2.27 from Ironton, we quote f.o.b. Cincinnati:

| | |
|---|--------------------|
| Southern coke, sil. 1.75 to 2.25 (base) | \$29.55 to \$31.05 |
| Southern coke, sil. 2.25 to 2.75 (No. 2 soft) | 30.05 to 31.55 |
| Ohio silvery, 8 per cent. | 41.77 |
| Southern Ohio coke, sil. 1.75 to 2.25 (No. 2) | 30.77 to 31.27 |
| Basic Northern | 30.77 |
| Malleable | 30.77 to 31.27 |

Finished Materials.—There has been little buying in the heavier products, but sheets are moving well, and some third quarter business has been placed at 3.25c for blue annealed and 4c for black. Most of the mills, however, are following the prices of the leading interests on black and blue annealed, but on galvanized sheets it is becoming more difficult to place an order at less than 5.15c. For early delivery 5.25c is being quoted. On automobile body sheets the price generally is 5.35c. Little business is coming out, though most manufacturers have reserved tonnage for their customers for third quarter delivery. One automobile body manufacturer has asked that his third quarter reservation be cancelled. An independent mill, which is promising delivery in four weeks, is quoting 2.75c. on plates, while another, with delivery running six weeks, is quoting 2.50c. One of the larger independents continues to quote plates at 2.60c., with bars and shapes at 2.50c. Plates are in fair demand from tank builders and gas holder manufacturers for early delivery. The week was a quiet one in wire products, few orders being placed. Shipments, however, on contracts are being anticipated by jobbers and manufacturers. Most of the mills welcome the lull in buying, as it give them an opportunity to catch up on orders. No new inquiries appeared for structural steel. Rein-

forcing bars, however, continue in good demand. The Kemper-Thomas addition at Norwood, requiring 300 tons, has been awarded to the Ferro-Concrete Construction Co. Prospective business includes a heating and power plant, for Purdue University at Lafayette, Ind., and an electrical engineering building for the same university, on which work will probably commence this summer.

Warehouse Business.—Local jobbers report a heavy demand for bars and small angles, as well as sheets and plates for quick delivery. Wire products, particularly nails, are also moving fast. There has been no change in prices.

Cincinnati jobbers quote: Iron and steel bars, 3.50c.; reinforcing bars, 3.60c.; hoops, 4.55c.; bands, 4.25c.; shapes, 3.60c.; plates, 3.60c.; cold-rolled rounds, 4.50c.; cold-rolled flats, squares and hexagons, 5c.; No. 10 blue annealed sheets, 4.25c.; No. 28 black sheets, 5.35c.; No. 28 galvanized sheets, 6.35c.; No. 9 annealed wire, \$3.60 per 100 lb.; common wire nails, \$3.60 per keg base.

Coke.—Some contracting for coke is reported for third quarter, but the market generally speaking is dull. Prices show hardly any change from those of last week. We note a sale of 2500 tons of Connells-ville furnace coke for immediate shipment at \$5, ovens.

Old Material.—There is no activity in the scrap market to speak of, carload sales predominating. Prices of steel grades are soft, but on cast the market is steady, and dealers believe the decline has been halted for the time being at least.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

| Per Gross Ton | |
|-------------------------------------|--------------------|
| Bundled sheets | \$15.50 to \$16.00 |
| Iron rails | 18.00 to 18.50 |
| Relaying rails, 50 lb. and up. | 29.50 to 30.00 |
| Rails for rolling | 20.00 to 20.50 |
| Heavy melting steel | 19.00 to 19.50 |
| Steel rails for melting | 16.50 to 17.00 |
| Car wheels | 18.50 to 19.00 |
| Per Net Ton | |
| No. 1 railroad wrought | 15.00 to 15.50 |
| Cast borings | 14.00 to 14.50 |
| Steel turnings | 13.00 to 13.50 |
| Railroad cast | 20.50 to 21.00 |
| No. 1 machinery cast | 23.50 to 24.00 |
| Burnt scrap | 14.50 to 15.00 |
| Iron axles | 25.00 to 25.50 |
| Locomotive tires (smooth inside) .. | 17.00 to 17.50 |
| Pipes and flues | 13.00 to 13.50 |

Canadian Scrap Market

TORONTO, ONT., May 29.—The Canadian iron and steel scrap market is showing general weakness in so far as demand is concerned. Consumers are buying only in small tonnages for immediate needs and dealers report little or no demand for third quarter. The recent falling off in demand has had the effect to loosen up supplies throughout the country and Toronto dealers say that they experience less difficulty in procuring material, and in some quarters prices are beginning to show a softening tendency. In the Montreal district some improvement is reported in the demand for scrap.

Prices paid by Canadian dealers for iron and steel scrap are as follows:

| Dealers' Buying Prices | Gross Tons | |
|-----------------------------|------------|----------|
| | Toronto | Montreal |
| Steel turnings | \$13.00 | \$14.00 |
| Machine shop turnings | 13.00 | 13.00 |
| Wrought pipe | 14.00 | 12.00 |
| Rails | 17.00 | 15.00 |
| No. 1 wrought scrap | 18.00 | 15.00 |
| Heavy melting steel | 16.00 | 17.00 |
| Steel axles | 18.00 | 18.00 |
| Axles, wrought iron | 21.00 | 24.00 |
| | Net Tons | |
| | Toronto | Montreal |
| Standard car wheels | 18.00 | 17.00 |
| Malleable scrap | 18.00 | 17.00 |
| Stove plate | 18.00 | 18.00 |
| No. 1 machinery cast | 22.00 | 24.00 |

Plans for the reorganization of the Defiance Machine Works, Defiance, Ohio, have been submitted to the Federal Court by the receiver, E. M. Hummer. It is proposed to issue \$600,000 10-year, first mortgage bonds, and to issue new preferred stock in place of the old stock.

Cleveland

Slight Increase in Pig Iron Activity with Lower Prices—Labor Shortage at Mines

CLEVELAND, May 29.—The shortage of labor has caused some of the underground ore mines to go on one shift, the owners deciding that it is better to operate on one shift with full crews than with short crews on two shifts. The ore movement has not yet made a good start owing to the irregularity of vessel movement and shipments from some of the mines had to be stopped during the week owing to the shortage of boat capacity. However shipments are expected to get well under way this week.

Pig Iron.—The market shows a little more life in that a few inquiries came out during the week for third quarter contracts. These include one from a Port Huron automobile foundry for 4000 tons, one from a Springfield foundry for 500 tons and one from another Ohio foundry for 1500 tons. Sales during the week were limited to lots ranging from car lots to 100 tons, all for early shipment. Sellers believe that consumers will not delay much longer in coming into the market for third quarter contracts and declare that the situation is favorable in that the melt shows no decrease and that there are no suspensions or cancellations. Prices show a slightly softer tendency. Valley furnaces appear to be no longer attempting to get above \$30 for foundry iron and it has been intimated to some consumers that if they wish to buy they would be quoted a lower price. Buffalo iron is now commonly quoted at \$29, which brings it into Cleveland at slightly under Valley iron at \$30. The lake furnace price is about \$31, although one local producer is still asking \$32. Steel making grades are inactive in this territory.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron includes a 50c. switching charge. Ohio silvery and Southern iron prices are based on a \$3.02 freight rate from Jackson and \$6 rate from Birmingham:

| | |
|---|--------------------|
| Basic, Valley furnace..... | \$28.00 to \$29.00 |
| Northern No. 2 fdy., sil. 1.75 to 2.25..... | 31.65 to 31.77 |
| Southern fdy., sil. 1.75 to 2.25..... | 31.65 to 31.77 |
| Malleable..... | 31.77 to 32.15 |
| Ohio silvery, 8 per cent..... | 42.52 |
| Standard low phos., Valley furnace..... | 36.00 |

Semi-finished Steel.—With the disappearing of premium prices on plates and sheets, buyers are insisting on lower prices for semi-finished steel. Mills are now getting good supplies of sheet bars and slabs. Sheet bars are being offered for early shipment at \$45. On a round lot inquiry for the third quarter, an Eastern mill quoted \$42.50, or equivalent to \$45.86, Youngstown, for Bessemer sheet bars.

Finished Iron and Steel.—Sentiment in the steel trade shows an improvement, although the volume of new business has further declined. There is some demand for material for early requirements, but little is being sold for extended deliveries. There is apparently no falling off in the consumption, and manufacturing plants and mill's are not getting suspensions or cancellations. Prices are drawing closer to the Steel Corporation's levels. Steel bars range from 2.40c. to 2.50c. Plates are decidedly easier. A local mill has reduced its price on plates \$4 a ton to 2.65c. Light plates in No. 10 gage are not over 3.15c., a decline of \$2 a ton. Eastern mills are still asking 2.75c. to 2.80c. at mill for plates and structural material, but these prices are now virtually keeping them out of the market. In the building field, the volume of inquiries for small work requiring less than 100 tons has improved. The Lundoff-Bicknell Co. was low bidder for the general contract for the Cleveland Public Library requiring 2500 tons of steel, bids for which were opened today.

Jobbers quote steel bars, 3.36c.; plates and structural shapes, 3.46c.; No. 9 galvanized wire, 3.70c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 4.75c.; No. 28 galvanized sheets, 5.90c.; No. 10 blue annealed sheets, 3.90c. to 4.06c.; cold rolled rounds, 3.90c.; flats, squares and hexagons, 4.40c.; hoops and bands, 1 in. and wider and 20 gage or heavier, 4.16c.; narrower than 1 in. or lighter than No. 20 gage, 4.60c.

Sheets.—Prices have pretty well settled down to the Steel Corporation level of 3.85c. for black and 5c.

for galvanized sheets, but blue annealed sheets are not as plentiful as the other grades, and some sellers are still getting 3.15c. to 3.25c. for these for early shipment. The volume of buying is light.

Reinforcing Bars.—Inquiry is coming out in fair volume, but lettings are rather slow. The Stange & Walsh Construction Co. was low bidder for the Baldwin filtration plant, Cleveland, requiring 1400 tons. Inquiry involves considerable tonnages, including the Paul Revere and Moses Cleaveland schools and the Hospital Clinic Building, Cleveland; the Hotel Jamestown, Jamestown, N. Y., and a 17-story office building, Louisville, Ky. Higher than 2.40c. appears to have disappeared on rail steel reinforcing bars, except for the small sizes.

Bolts, Nuts and Rivets.—Specifications for bolts and nuts are heavy, but very little new business is being placed, as most consumers are under contract at the old prices. Rivet makers are getting a good volume of specifications, particularly from car builders and oil companies, and some new inquiries from car companies in lots up to 300 tons have come out.

Coke.—Prices are holding close to recent levels with quotations ranging from \$6.25 to \$7.25 for the better Connellsville grades and \$6 and lower quotations for other grades.

Old Material.—With virtually no buying to give the market support, scrap prices have continued to decline. Heavy melting steel is close to \$2 a ton lower than a week ago, being freely offered from \$19.75 to \$20, but the reduced quotations are not tempting consumers. Prices on a number of other grades have similarly declined. Borings and turnings are holding up well as compared with most other grades. Little, if any, speculative buying is in evidence, although some dealers think prices have about reached bottom.

We quote per gross ton f.o.b. Cleveland as follows:

| | |
|---------------------------------------|--------------------|
| Heavy melting steel..... | \$19.75 to \$20.00 |
| Rails for rolling..... | 22.25 to 23.00 |
| Rails under 3 ft..... | 21.00 to 22.00 |
| Low phosphorus melting..... | 22.50 to 23.00 |
| Cast borings..... | 17.00 to 17.25 |
| Machine shop turnings..... | 16.75 to 17.00 |
| Mixed borings and short turnings..... | 16.50 to 16.75 |
| Compressed sheet steel..... | 18.00 to 18.50 |
| Railroad wrought..... | 17.00 to 18.00 |
| Railroad malleable..... | 25.00 to 25.50 |
| Light bundled sheet stampings..... | 12.75 to 13.00 |
| Steel axle turnings..... | 17.75 to 18.00 |
| No. 1 cast..... | 23.50 to 24.00 |
| No. 1 busheling..... | 16.00 to 17.00 |
| Drop forge flashings..... | 16.75 to 17.00 |
| Railroad grate bars..... | 17.00 to 18.00 |
| Stove plate..... | 17.00 to 18.00 |
| Pipes and flues..... | 13.00 to 13.50 |

New Company to Operate Mechanical Puddling Plant

A new company is to be formed by the Youngstown Steel Co., Youngstown, to operate its mechanical puddling plant at Warren, Ohio. This company will probably be known as the American Puddle Iron Co., with an authorized capital of several million dollars.

A stock offering is planned for the near future, proceeds to be employed in completing the plant at Warren and providing working capital. Some of the rolling mill equipment has already been installed in the new plant, but the mechanical puddlers are not yet in place. From present indications, initial operations, which have been somewhat delayed, may be expected to start in about four months.

E. L. Ford, a director of the Youngstown Sheet & Tube Co. and one of the veteran iron and steel manufacturers of the Mahoning Valley, invented the device which will be used by the company in puddling iron, without the use of manual labor. This mechanical puddler is the result of years of experimentation and research on Mr. Ford's part.

With quantity production, it is believed that wrought iron can be produced in this manner about as cheaply as steel. Development of a mechanical puddler is also of considerable interest to the trade at this time in view of the growing shortage of skilled operatives in this branch of the industry.

DISSIPATION OF IRON

Effect of Colloidal Ferrous Oxide Operating in Repeating Cycles

Lord Kelvin in 1852 first showed that, although the total amount of energy in the universe is apparently a constant quantity, its availability for the use and convenience of man is steadily diminishing. An editorial in *Engineering* (London) which takes up this subject of the dissipation of natural resources, is quoted in part in the following paragraphs.

While there is reasonable hope that civilization may long evade being brought to a standstill by the dissipation of energy, there is at present less prospect of finding a remedy for the steady dissipation of iron in the form of rust, which has been estimated by Sir Robert Hadfield at 29,000,000 tons annually, or not far from one-quarter of the normal output. A pessimistic estimate of the world's resources, made by Professor Torneholm in 1905, placed the total visible supplies at 10,000,000,000 tons, while the world's output at that date was estimated at 100,000,000 tons annually and was increasing so rapidly as to lead to a fear of exhaustion of our resources by 1946.

No doubt the above estimate of the world's resources was far too modest, but the supply of readily won and readily converted ores is undoubtedly limited, even though it is probable that the earth is in the main a mass of metalliferous iron. At present, however, the practicability of working this central core is even less conceivable than that of realizing the beneficial use of the atomic stores of energy which Sir Ernest Rutherford has already successfully tapped, although on a truly infinitesimal scale. It is indeed conceivable that mankind may in the far future be driven to restrict the use of iron to special purposes, such as the field magnets and armatures of electro-generating machinery motors, but long before such a policy becomes imperative, steps will have been taken to minimize the steady dissipation of iron and steel by rust.

Corrosion of Wrought Iron and Cast Iron

As far back as 1840 Mallet, under the auspices of the British Association, made a magnificent series of researches on the relative corrodibilities of wrought iron and cast iron. As is usually the case, however, with even the most careful and laborious experimental work, which does not result in any clear cut theory, these investigations were for the most part soon forgotten. Data, apparently contradictory, can be assimilated in general only as isolated facts based on actual personal experience, resembling thus the rules of thumb of the craftsman before the progress of science had established the rationale of many manufacturing operations.

In the case of iron the experimental facts are remarkably erratic. Wrought iron, for example, is readily dissolved by ordinary sulphuric acid, but resists the fuming acid and, as is well known, iron can be rendered "passive" by contact with strong nitric acid. Why, again, is iron rendered so brittle by the absorption of hydrogen, recovering its ductibility when annealed or left for a sufficient time to stand in the dry? No wholly satisfactory explanation of these peculiarities seems yet to be forthcoming in spite of the numerous researches made during the past 60 years. One of the first points to be established was that corrosion did not occur in the absence of an electrolyte. Iron exposed to the action of pure water does not rust nor does it rust in dry air; neither does it rust in moist air, if the temperature is high enough to prevent deposit of the water on the surface.

Colloidal Theory Presented

Dr. Friend, however, concludes that, though an electrolyte is necessary, another factor is also at work in the rusting of iron. His view is that when iron is brought into contact with air and liquid water, colloidal ferrous oxide is produced, which picks up further oxygen while still retaining the colloidal form. This higher colloidal oxide is, he considers, capable of catalytically accelerating the oxidation of the iron, while it simultaneously undergoes reduction to a lower

colloidal hydroxide, and the cycle is thus repeated again and again, rust being produced when the colloid flocculates or precipitates out.

According to this theory, the higher colloidal oxide acts as a catalyst and catalysts are, as is well known, capable of being "poisoned"; Dr. Friend's view accordingly receives confirmation from the fact that arsenious oxide is a powerful inhibitor of corrosion. Another peculiarity for which he is able to account is that iron exposed to the action of water (containing air) does not rust if the water is moving relatively to the iron at a speed of three to five miles an hour, while in a similar experiment made with dilute acid the attack was found to increase with the speed of the fluid. In the former case Dr. Friend holds that the rapid motion removes the colloidal hydroxide which acted as a catalyst, and thus rusting is checked.

Long-Lived Cast Iron Water Mains

Among the interesting historical data collected by Dr. Friend are some valuable notes on the endurance of cast iron when buried in the ground. Although for actuarial purposes it has been common to adopt a conventional life of 50 years for cast iron water mains, it has long been known that this limit is in general far too low. Some of the gas mains broken in London streets by bombs during the German air raids had been down for well over 100 years and, apart from destruction by violence, appeared to be good for another century at least. Dr. Friend states that cast iron pipes laid at Clermont Ferrand in 1748 were still in service in 1908; and five lines of cast iron pipe, 1000 ft. long, laid in 1685 to convey water to the fountains at Versailles, were reported in 1909 to be apparently in as good condition as when installed. On the other hand, in the case of the great main, 350 miles long, to Coolgardie, West Australia, it appears that the few castings employed have corroded seriously, much more so than the wrought steel pipes.

In sea water cast iron resists badly, the iron being to a large extent dissolved out, leaving graphite behind. Thus, in 1836, cannon balls from the "Mary Rose," sunk off Portsmouth in 1545, were raised. While maintaining their original dimensions, the loss of iron had reduced the weight from 30 lb. to little more than 19 lb., while the 70-lb. shot weighed only 45 lb. When exposed to air these shot became red hot spontaneously and fell to pieces.

Alloys to Resist Corrosion

Possibly the future may see a great development of the adoption of the corrosion resisting alloys of iron, of which a limited use is now being made. This, if commercially practicable, would certainly be the ideal solution of the problem of eliminating the present dissipation of iron by rust. In the meantime, however, reliance must be placed on paint and on prevention by electrolytic means. Dr. Friend has made a large number of experiments on the relative value of paints for this purpose. The maximum protection was found to be afforded by paints in which the proportion of oil was just sufficient to insure smooth working properties under the brush. With ferric oxide as the pigment, and linseed oil as the vehicle, the best results were obtained with a 50-50 mixture, the weight applied being 7 to 9 lb. per 100 sq. yd. With thicker coatings, the corrosion was greater.

Steel Treathers' Eastern Sectional Meeting

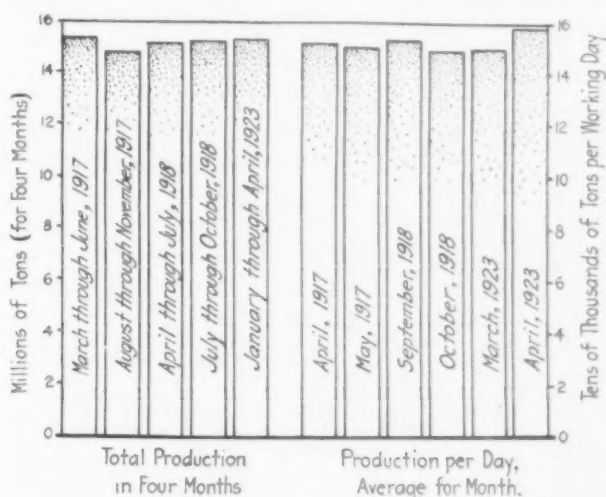
The eastern sectional meeting of the American Society for steel Treating is to be held in Bethlehem, Pa., June 14 and 15, as the guest of the Lehigh Valley chapter. The headquarters will be at the Hotel Bethlehem, a new hotel open to the public last fall. The first day will be taken up with the presentation of a few papers, not yet announced, on heat treatment subjects, and one of the features of the gathering will be a trip through the steel plant of the Bethlehem Steel Co., Friday morning, June 15. This is the second eastern sectional meeting of the organization, the first having been held in New York under the auspices of the New York chapter in March, 1922.

GREATEST STEEL PRODUCTION

Four Months of 1923 Show Highest Daily Rate of Any Four Consecutive Months—Closely Approached by War Production

While the first four months of 1923 showed an ingot output of 15,326,277 gross tons, compared with 15,332,514 gross tons in the four months of March, April, May and June, 1917, the 1923 figures represent the production of 103 days only against 105 working days in the previous case. This makes the average daily output 148,799 tons in the first four months of this year, against 146,024 tons in the four months in 1917 mentioned.

Calculations for the 1923 tonnage are based on the ratio obtaining through the year 1922 between the 30 companies reporting monthly output figures to the



Steel Ingot Production in the Five Greatest 4-Month Periods in Our History and in the Six Greatest Single Months. It will be noted that the high-output months occurred in pairs

American Iron and Steel Institute and the total production of all companies. This ratio is reported by the institute at 84.13 per cent, resulting from a total production in 1922 of 34,608,880 gross tons (unofficial figures) in 310 working days, or 111,642 tons per day. In the table will be found the reported ingot tonnage month by month for all of 1922 and the first four months of 1923, together with the calculated total tonnage on the percentage basis reported by the institute and the gross tons per working day for the 16 months covered.

Not only was the present record closely duplicated

by the four months mentioned in 1917, but it was also approached by the months of July, August, September and October, 1918, when the total production figured out at 15,276,825 tons, or 145,494 tons for each of the 105 working days of that period. The months of April, May, June and July of 1918 showed another large total with 15,177,646 tons, or 145,939 tons for each of the 104 working days covered. The next best record was that of August, September, October and November, 1917, with 14,795,476 tons, or 140,909 tons for each of the 105 working days.

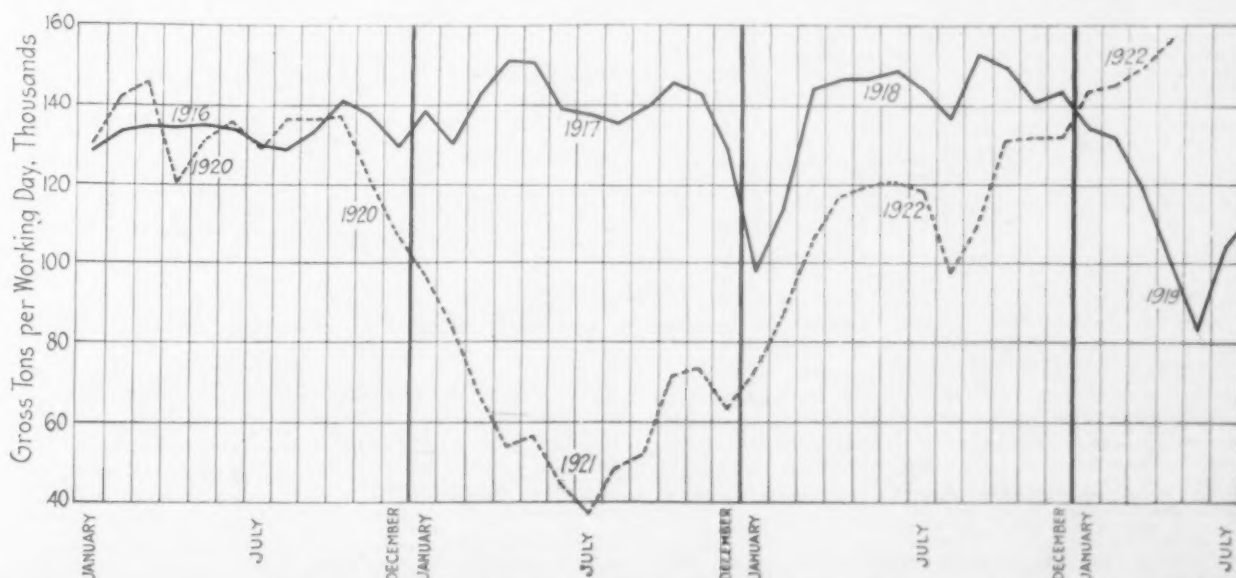
It is significant in this connection that reported operations at the beginning of May were higher than in any of the immediately preceding months. When the

Steel Ingot Output of United States

| 1922 | Reported Tonnage | Apparent Total | Working Days | Gross Tons per Day |
|-------------|------------------|----------------|--------------|--------------------|
| January | 1,593,482 | 1,894,060 | 26 | 72,848 |
| February | 1,745,022 | 2,074,185 | 24 | 86,424 |
| March | 2,370,751 | 2,817,945 | 27 | 104,368 |
| April | 2,444,513 | 2,965,621 | 25 | 118,225 |
| May | 2,711,141 | 3,222,543 | 27 | 119,353 |
| June | 2,634,477 | 3,131,418 | 26 | 120,439 |
| July | 2,487,104 | 2,956,246 | 25 | 118,250 |
| August | 2,214,582 | 2,632,317 | 27 | 97,493 |
| September | 2,373,779 | 2,821,544 | 26 | 108,521 |
| October | 2,872,415 | 3,414,239 | 26 | 131,317 |
| November | 2,889,297 | 3,434,503 | 26 | 132,096 |
| December | 2,779,890 | 3,304,259 | 25 | 132,170 |
| First half | 13,499,386 | 16,045,772 | 155 | 103,521 |
| Second half | 15,617,067 | 18,563,108 | 155 | 119,762 |
| Year | 29,116,453 | 34,608,880 | 310 | 111,642 |
| 1923 | | | | |
| January | 3,251,694 | 3,865,083 | 27 | 143,151 |
| February | 2,919,017 | 3,469,651 | 24 | 144,569 |
| March | 3,402,007 | 4,043,750 | 27 | 149,769 |
| April | 3,321,278 | 3,947,793 | 25 | 157,912 |
| Four months | 12,893,996 | 15,326,277 | 103 | 148,799 |

May figures become available, therefore, it is possible that a new monthly record, a new daily record and a new four-months record may have been established. At present the monthly record appears to rest with May of 1917, with a total of 4,060,532 gross tons.

As no monthly figures of ingot output became available prior to those for June, 1917, the figures for earlier months have been calculated on the basis of the number of working days per month, the rate of output of pig iron in each month and the ratio between the total ingot production of the year and the total pig iron production of the year. Figures for those preceding months, therefore, while the best obtainable, cannot be regarded as absolutely determined. Neither can the figures for later months, however, including those right up to date, because each such figure is based upon the assumption that the average ratio for the year between the production of 30 companies and the total production was also the ratio for each individual month. Again, however, the figures represent the best obtainable and are accurate within very narrow limits.



Course of Steel Ingot Production in the United States, in Gross Tons per Working Day, Covering the Periods of Greatest Activity Over the War Period and Since the War

Prices Finished Iron and Steel f.o.b. Pittsburgh

Carload Lots

| Plates | |
|--------------------------------------|--------|
| Sheared, tank quality, base, per lb. | 2.50c. |
| Structural Material | |
| Beams, channels, etc., base, per lb. | 2.50c. |
| Sheet piling | 2.65c. |

| Iron and Steel Bars | |
|---|-----------------------|
| Soft steel bars, base, per lb. | 2.40c. |
| Soft steel bars, screw stock quality | \$3 per ton over base |
| Reinforcing steel bars, base | 2.40c. |
| Refined iron bars, base, per lb. | 3.25c. |
| Double refined iron bars, base, per lb. | 4.85c. to 5.00c. |
| Stay bolt iron bars, base, per lb. | 8.00c. to 8.50c. |

| Hot-Rolled Flats | |
|---|--------|
| Hoops, ordinary gages and widths, base, per lb. | 3.30c. |
| Hoops, light gage, under 1 in. wide | 3.50c. |
| Bands, base, per lb. | 3.30c. |
| Strips, base, per lb. | 3.30c. |
| Cotton ties, per bundle of 45 lb. | \$1.60 |

| Cold-Finished Steels | |
|----------------------------------|--------|
| Bars and shafting, base, per lb. | 3.25c. |
| Strips, base, per lb. | 5.25c. |

| Wire Products | |
|--|--------------------------|
| Nails, base, per keg | \$3.00 |
| Galvanized nails, 1 in. and over | \$2.25 over base |
| Galvanized nails, less than 1 in. | 2.50 over base |
| Bright plain wire, base, No. 9 gage, per 100 lb. | 2.75 |
| Annealed fence wire, base, per 100 lb. | 2.90 |
| Spring wire, base, per 100 lb. | 3.70 |
| Galvanized wire, No. 9, base, per 100 lb. | 3.35 |
| Galvanized barbed, base, per 100 lb. | 3.80 |
| Galvanized staples, base, per keg | 3.80 |
| Painted barbed wire, base, per 100 lb. | 3.45 |
| Polished staples, base, per keg | 3.45 |
| Cement coated nails, base, per count keg | 2.70 |
| Woven fence, carloads (to jobbers) | 67 1/2 per cent off list |
| Woven fence, carloads (to retailers) | 65 per cent off list |

| Bolts and Nuts | |
|--|---------------------------------------|
| Machine bolts, small, rolled threads | 50 per cent off list |
| Machine bolts, small, cut threads | 40 and 10 per cent off list |
| Machine bolts, larger and longer | 40 and 10 per cent off list |
| Carriage bolts, 3/4 x 6 in. | |
| Smaller and shorter, rolled threads | 45 per cent off list |
| Cut threads | 40 per cent off list |
| Longer and larger sizes | 40 per cent off list |
| Lag bolts | 50 per cent off list |
| Flow bolts, Nos. 1, 2 and 3 heads | 40 and 10 per cent off list |
| Other style heads | 20 per cent extra |
| Machine bolts, c.p.c. and t. nuts, 3/4 x 4 in. | |
| Smaller and shorter | 35 and 5 per cent off list |
| Larger and longer sizes | 35 and 5 per cent off list |
| Hot pressed square or hex. nuts, blank | \$3.00 off list |
| Hot pressed nuts, tapped | 2.75 off list |
| C.p.c. and t. square or hex. nuts, blank | 3.00 off list |
| C.p.c. and t. square or hex. nuts, tapped | 2.75 off list |
| Semi-finished hex. nuts: | |
| 3/8 in. and smaller, U. S. S. | 75 and 5 per cent off list |
| 1/2 in. and larger, U. S. S. | 70 and 2 1/2 per cent off list |
| Small sizes, S. A. E. | 75, 10 and 5 per cent off list |
| S. A. E., 3/4 in. and larger | 75, 10 and 2 1/2 per cent off list |
| Stove bolts in packages | 75, 10 and 5 per cent off list |
| Stove bolts in bulk | 75, 10, 5 and 2 1/2 per cent off list |
| Tire bolts | 50, 10 and 10 per cent off list |

| Cap and Set Screws | |
|---|-----------------------------|
| Milled square and hex. head cap screws, | 70 and 10 per cent off list |
| Milled set screws | 70 and 10 per cent off list |
| Upset cap screws | 75 per cent off list |
| Upset set screws | 75 per cent off list |

| Rivets | |
|---|--------------------------------|
| Large structural and ship rivets, base, per 100 lb. | \$3.25 to \$3.50 |
| Large boiler rivets, base, per 100 lb. | 3.35 to 3.60 |
| Small rivets | 60 and 10 to 60 and 5 off list |

| Track Equipment | |
|---|----------------|
| Spikes, 3/8 in. and larger, base, per 100 lb. | \$3.15 |
| Spikes, 1/2 in., 3/4 in. and 5/8 in., per 100 lb. | 3.75 |
| Spikes, 3/4 in. | 3.75 |
| Spikes, boat and barge, base, per 100 lb. | \$3.50 to 3.75 |
| Track bolts, 3/4 in. and larger, base, per 100 lb. | 4.25 to 4.50 |
| Track bolts, 1/2 in. and 3/4 in., base, per 100 lb. | 5.50 |
| Tie plates, per 100 lb. | 2.60 to 2.75 |
| Angle bars, base, per 100 lb. | 2.75 |

| Welded Pipe | |
|-------------|--------|
| Butt Weld | |
| Inches | Steel |
| 1/4 | 45 |
| 1/2 | 51 |
| 3/4 | 56 |
| 1 | 60 |
| 1 1/2 | 62 |
| Inches | Iron |
| 1/4 | 19 1/2 |
| 1/2 | 25 1/2 |
| 3/4 | 42 1/2 |
| 1 | 48 1/2 |
| 1 1/2 | 50 1/2 |

| Lap Weld | |
|------------|----|
| 2 | 55 |
| 2 1/2 to 6 | 59 |
| 7 and 8 | 56 |
| 9 and 10 | 54 |
| 11 and 12 | 53 |

| Butt Weld, extra strong, plain ends | |
|-------------------------------------|----|
| 1/4 | 41 |
| 1/2 to 3/4 | 47 |
| 3/4 | 53 |
| 1 | 58 |
| 1 to 1 1/2 | 60 |

| Lap Weld, extra strong, plain ends | |
|------------------------------------|----|
| 2 | 53 |
| 2 1/2 to 4 | 57 |
| 4 1/2 to 6 | 56 |
| 7 to 8 | 52 |
| 9 and 10 | 45 |
| 11 and 12 | 44 |

To the large jobbing trade the above discounts are increased by one point, with supplementary discount of 5 per cent on black and 1 1/2 points, with a supplementary discount of 5 per cent, on galvanized.

| Boiler Tubes | |
|--------------------|---------------|
| Lap Welded Steel | Charcoal Iron |
| 2 to 2 1/4 in. | 27 |
| 2 1/2 to 2 3/4 in. | 37 |
| 3 in. | 40 |
| 3 1/4 to 3 3/4 in. | 42 1/2 |
| 4 to 13 in. | 46 |

| Standard Commercial Seamless Boiler Tubes | |
|---|----|
| Cold Drawn | |
| 1 in. | 55 |
| 1 1/4 and 1 1/2 in. | 47 |
| 1 3/4 in. | 31 |
| 2 and 2 1/4 in. | 22 |
| 2 1/2 and 2 3/4 in. | 32 |

| Hot Rolled | |
|-------------------------|----|
| 3 and 3 1/4 in. | 38 |
| 3 1/2 in. and 3 3/4 in. | 39 |

Less carloads, 4 points less. Add \$8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of net larger outside diameter and heavier gage.

Carbon under 0.30, base, 83 per cent off list
Carbon 0.30 to 0.40, base, 81 per cent off list
Plus usual differentials and extras for cutting. Warehouse discounts range higher.

| Seamless Locomotive and Superheater Tubes | |
|---|---------------|
| Cents per Ft. | Cents per Ft. |
| 2-in. O.D. 12 gage | 15 |
| 2-in. O.D. 11 gage | 16 |
| 2-in. O.D. 10 gage | 17 |
| 2 1/4-in. O.D. 12 gage | 17 |
| 2 1/4-in. O.D. 11 gage | 18 |

| Tin Plate | |
|------------------------------|------------------|
| Standard cokes, per base box | \$5.50 to \$5.75 |

| Terne Plate | |
|-----------------------------|---------|
| (Per package, 20 x 28 in.) | |
| 8-lb. coating, 100 lb. base | \$11.00 |
| 8-lb. coating I. C. | 11.30 |
| 12-lb. coating I. C. | 12.70 |
| 15-lb. coating I. C. | 13.95 |

| Sheets | |
|-------------------------------|------------------|
| Blue Annealed | |
| Nos. 9 and 10 (base), per lb. | 3.00c. to 3.25c. |

| Box Annealed, One Pass Cold Rolled | |
|------------------------------------|------------------|
| No. 28 (base), per lb. | 3.85c. to 4.00c. |

| Automobile Sheets | |
|---|--------|
| Regular auto body sheets, base (22 gage), per lb. | 5.35c. |

| Galvanized | |
|------------------------|------------------|
| No. 28 (base), per lb. | 5.00c. to 5.25c. |

| Long Ternes | |
|--|--------|
| No. 28 gage (base), 8-lb. coating, per lb. | 5.30c. |

| Tin-Mill Black Plate | |
|------------------------|------------------|
| No. 28 (base), per lb. | 3.85c. to 4.00c. |

Manufacturers have pamphlets, which can be had upon application, giving price differentials for gage and extras for length, width, shearing, etc.

Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

| | | | | | | | |
|------------------------|--------|-----------------------|--------|--------------------|--------|------------------------------|--------|
| Philadelphia, domestic | \$0.32 | Buffalo | \$0.26 | St. Louis | \$0.43 | Pacific Coast | \$1.34 |
| Philadelphia, export | 0.235 | Cleveland | 0.21 | Kansas City | 0.735 | Pac. Coast, ship plates | 1.20 |
| Baltimore, domestic | 0.31 | Cleveland, Youngstown | | Kansas City (pipe) | 0.705 | Birmingham | 0.69 |
| Baltimore, export | 0.225 | Comb. | 0.19 | St. Paul | 0.60 | Memphis | 0.385 |
| New York, domestic | 0.34 | Detroit | 0.29 | Omaha | 0.735 | Jacksonville, all rail | 0.50 |
| New York, export | 0.255 | Cincinnati | 0.29 | Omaha (pipe) | 0.705 | Jacksonville, rail and water | 0.415 |
| Boston, domestic | 0.365 | Indianapolis | 0.31 | Denver | 1.27 | New Orleans | 0.515 |
| Boston, export | 0.255 | Chicago | 0.34 | Denver (pipe) | 1.215 | | |

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 30c. to 40c.; ship plates, 30c. to 40c.; ingot and muck bars, structural steel, common wire products including cut or wire nails, spikes, and wire hoops, 30c. to 40c.; sheets and tin plates, 30c. to 40c.; rods, wire rope cable and strands, 75c.; wire fencing, netting and stretcher, 49c.; pipes not over 8 in. in diameter, 50c.; over 8 in. in diameter, 2 1/2c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Prices of Raw Materials, Semi-Finished and Finished Products

Ores

| Lake Superior Ores, Delivered Lower Lake Ports | |
|---|-----------------|
| Old range Bessemer, 55 per cent iron..... | \$6.45 |
| Old range non-Bessemer, 51½ per cent iron..... | 5.70 |
| Messabi Bessemer, 55 per cent iron..... | 6.20 |
| Messabi non-Bessemer, 51½ per cent iron..... | 5.55 |
| Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore | |
| Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian..... | 11½c. |
| Iron ore, Swedish, average 66 per cent iron..... | 11c. to 11.25c. |
| Manganese ore, washed, 51 per cent manganese, from the Caucasus, nominal..... | 48c. |
| Manganese ore, ordinary, 48 per cent manganese, from the Caucasus..... | 42c. |
| Manganese ore, Brazilian or Indian, nominal..... | 45c. |
| Tungsten ore, per unit, in 60 per cent concentrates..... | \$8.50 |
| Chrome ore, basic, 48 per cent Cr ₂ O ₃ , crude, per ton, c.i.f. Atlantic seaboard..... | 18.00 to 28.00 |
| Molybdenum ore, 85 per cent concentrates, per lb. of MoS ₂ , New York..... | 75c. to 85c. |

Ferroalloys

| | |
|---|----------------------|
| Ferromanganese, domestic, 80 per cent, furnace, or seaboard, per ton..... | \$120.00 to \$130.00 |
| Ferromanganese, British, 80 per cent, f.o.b. Atlantic port, duty paid..... | 125.00 to 130.00 |
| Spiegeleisen, domestic, 19 to 21 per cent, seaboard, per ton..... | 45.00 to 47.50 |
| Spiegeleisen, domestic, 16 to 19 per cent, furnace, per ton, nominal..... | 43.00 |
| Ferrosilicon, 50 per cent, delivered per gross ton..... | 92.50 to 95.00 |
| Ferrosilicon, Bessemer, 10 per cent, per ton, furnace..... | 48.50 |
| Ferrosilicon, Bessemer, 11 per cent, per ton, furnace..... | 51.80 |
| Ferrosilicon, Bessemer, 12 per cent, per ton, furnace..... | 55.10 |
| Ferrosilicon, Bessemer, 13 per cent, per ton, furnace..... | 59.10 |
| Ferrosilicon, Bessemer, 14 per cent, per ton, furnace..... | 64.10 |
| Silvery iron, 6 per cent, per ton, furnace..... | 37.00 |
| Silvery iron, 7 per cent, per ton, furnace..... | 38.00 |
| Silvery iron, 8 per cent, per ton, furnace..... | 39.50 |
| Silvery iron, 9 per cent, per ton, furnace..... | 41.50 |
| Silvery iron, 10 per cent, per ton, furnace..... | 43.50 |
| Silvery iron, 11 per cent, per ton, furnace..... | 46.80 |
| Silvery iron, 12 per cent, per ton, furnace..... | 50.10 |
| Ferrotungsten, per lb. contained metal..... | 88c. to 90c. |
| Ferrochromium, 4 to 6 per cent carbon, 60 to 70 per cent Cr. per lb. contained Cr. delivered..... | 12c. |
| Ferrochromium, 6 to 7 per cent carbon, 60 to 70 per cent Cr., per lb..... | 11.50c. |
| Ferrovanadium, per lb. contained vanadium..... | \$3.50 to \$4.00 |
| Ferrocobaltititanium, 15 to 18 per cent, per net ton..... | 200.00 |

Fluxes and Refractories

| | |
|---|---|
| Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica per net ton f.o.b. Illinois and Kentucky mines..... | \$22.00 |
| Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica per net ton, f.o.b. Illinois and Kentucky mines..... | 23.50 |
| Per 1000 f.o.b. works: | |
| Fire Clay: | |
| Pennsylvania..... | High Duty \$48.00 to \$51.00 Moderate Duty \$43.00 to \$46.00 |
| Ohio..... | 45.00 to 47.00 40.00 to 43.00 |
| Kentucky..... | 45.00 to 47.00 42.00 to 45.00 |
| Illinois..... | 48.00 to 50.00 45.00 to 47.00 |
| Missouri..... | 48.00 to 50.00 38.00 to 43.00 |
| Ground fire clay, per net ton..... | 6.50 to 9.50 |
| Silica Brick: | |
| Pennsylvania..... | 47.00 |
| Chicago..... | 52.00 |
| Birmingham..... | 48.00 |
| Ground silica clay, per net ton..... | 10.00 |
| Magnesite Brick: | |
| Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)..... | 65.00 |
| Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)..... | 40.00 |
| Chrome Brick: | |
| Standard size, per net ton..... | 50.00 |

Semi-Finished Steel, f.o.b. Pittsburgh or Youngstown, per gross ton

| | |
|--|--------------------------|
| Rolling billets, 4-in. and over..... | \$43.00 to \$45.00 |
| Rolling billets, 2-in. and under..... | 45.00 |
| Forging billets, ordinary carbons..... | 55.00 |
| Sheet bars, Bessemer..... | 45.00 |
| Sheet bars, open-hearth..... | 45.00 |
| Slabs..... | 45.00 |
| Wire rods, common soft, base, No. 5 to ¼-in..... | 51.00 |
| Wire rods, common soft, coarser than ¼-in..... | \$2.50 over base |
| Wire rods, screw stock..... | \$5 per ton over base |
| Wire rods, carbon 0.20 to 0.40..... | \$3 per ton over base |
| Wire rods, carbon 0.41 to 0.55..... | \$5 per ton over base |
| Wire rods, carbon 0.56 to 0.75..... | \$7.50 per ton over base |
| Wire rods, carbon over 0.75..... | \$10 per ton over base |
| Wire rods, acid..... | \$15 per ton over base |
| Skelp, grooved, per lb..... | 2.45 |
| Skelp, sheared, per lb..... | 2.45 |
| Skelp, universal, per lb..... | 2.45 |

Finished Iron and Steel, f.o.b. Mill

| | |
|---|------------------|
| Rails, heavy, per gross ton..... | \$43.00 |
| Rails, light, new steel, base, per lb..... | 2.25c. |
| Rails, light, rerolled, base, per lb..... | 2.15c. to 2.20c. |
| Spikes, ¾-in. and larger, base, per 100 lb..... | \$3.15 to \$3.25 |
| Spikes, ½-in., ¾-in. and ¾-in., base, per 100 lb..... | 3.25 to 3.75 |
| Spikes, ¾-in., base, per 100 lb..... | 3.25 to 3.75 |
| Spikes, boat and barge, base, per 100 lb..... | 3.50 to 3.75 |
| Track bolts, ¾-in. and smaller, base, per 100 lb..... | 4.25 to 5.50 |
| Track bolts, ¾-in. and larger, base, per 100 lb..... | 4.25 to 4.50 |
| Tie plates, per 100 lb..... | 2.55 to 2.60 |
| Angle bars, per 100 lb..... | 2.75 |
| Bars, common iron, base, per lb..... | 2.50c. to 2.60c. |
| Bars, rail, steel reinforcing, base, per lb..... | 2.15c. to 2.25c. |
| Ground shafting, base, per lb..... | 3.65c. |
| Cut nails, base, per keg..... | \$3.40 |

Alloy Steel

| S.A.E. Series Numbers | Bars 100 lb. |
|--|----------------|
| 2100 (½% Nickel, 10 to 20 per cent Carbon)... | \$3.75 |
| 2300 (3½% Nickel)..... | \$5.50 to 5.75 |
| 2500 (5% Nickel)..... | 8.25 |
| 3100 (Nickel Chromium)..... | 4.75 |
| 3200 (Nickel Chromium)..... | 6.50 |
| 3300 (Nickel Chromium)..... | 8.50 |
| 3400 (Nickel Chromium)..... | 7.50 |
| 5100 (Chromium Steel)..... | 4.25 |
| 5200 (Chromium Steel)..... | 8.50 |
| 6100 (Chromium Vanadium bars)..... | 5.25 to 5.50 |
| 6100 (Chromium Vanadium spring steel)..... | 5.00 to 5.25 |
| 9250 (Silico Manganese spring steel)..... | 4.25 |
| Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chromium, 0.15 Vanadium)..... | 5.75 |
| Chromium Molybdenum bars (0.70-1 Chromium, 0.25-0.40 Molybdenum)..... | 4.75 |
| Chromium Molybdenum spring steel (0.50-0.70 Chromium, 0.15-0.25 Molybdenum)..... | 4.50 to 4.75 |

Above prices are for hot-rolled alloy steel bars, forging quality, per 100 lb. f.o.b. Pittsburgh. Billets 4 x 4 in. and larger are \$10 per gross ton less than net ton price for bars of same analyses. On smaller than 4 x 4-in. billets down to and including 2½-in. sq. there is a size extra of \$10 per gross ton; on billets smaller than 2½-in. sq. the net ton bar price applies.

Present Wages of Steel Mill Workers Will Be Continued

Agreement was reached during the past week at Atlantic City between representatives of the Western Sheet and Tin Plate Manufacturers' Association and the Amalgamated Association of Iron, Steel and Tin Workers with reference to the 1923-24 wage scale and working conditions.

An agreement was entered into along virtually the same lines as embodied in the current contract, which expires June 30. A number of changes were made in the rules relating to working conditions, but the

base tonnage rates were left practically the same as before.

Sheet workers presented demands for increases in the base rates ranging from 10 to 20 per cent, for the various operations. Manufacturers opposed any advances at this time, pointing out that costs had already forced prices to a point where it was feared buying would be checked.

Employees had formulated their demands previously at their annual conference, held in Warren, Ohio.

Conference to reach a wage agreement in the bar iron division of the industry follows the sheet and tin plate conference.

NON-FERROUS METALS

The Week's Prices

| Cents per Pound for Early Delivery | | | | | | | |
|------------------------------------|-------|----------------|----------|----------|-----------|----------|-----------|
| Copper, New York | | Straits Tin | | Lead | | Zinc | |
| May | Lake | Electro-lytic* | New York | New York | St. Louis | New York | St. Louis |
| 23..... | 15.75 | 15.12 1/2 | 42.25 | 7.30 | 7.05 | 7.00 | 6.65 |
| 24..... | 15.75 | 15.12 1/2 | 42.50 | 7.30 | 7.05 | 6.85 | 6.50 |
| 25..... | 15.50 | 15.00 | 42.25 | 7.30 | 7.05 | 6.80 | 6.45 |
| 26..... | 15.50 | 15.00 | | 7.30 | 7.05 | 6.80 | 6.45 |
| 28..... | 15.50 | 14.75 | 41.75 | 7.30 | 7.05 | 6.75 | 6.40 |

*Refinery quotation; delivered price ¼c. higher.

New York

NEW YORK, May 28.

Some of the markets are weaker and some are stronger. Weakness has again developed in the copper market and prices are lower. The tin market is steady to higher. The lead market, while not strong, is fairly firm. Zinc has again declined.

Copper.—The strength in the copper market, which was in evidence a week ago, was short lived. Within the last few days weakness has again developed and today lower prices than those registered about 10 days ago have prevailed, namely 15c., delivered, for electrolytic copper, at which level offerings were made today. Consuming demand is light and consumers are holding back again, due partly to the fact that new orders for finished material are not coming in in large volume and also to the fact that the declines in the London market are also having their effect. Considerable uncertainty prevails as to the future of this market. Lake copper is lower at 15.50c. to 15.62½c., delivered.

Tin.—With the exception of three days last week the market has been very quiet, but prices have been fairly steady. For the three days ending with May 24 the market was active and about 1200 tons changed hands. Most of the business was between dealers, although consumers took fair quantities. Much of the business was on selling offers from London. On the same days about 200 tons was sold on the New York Metal Exchange. On Friday, May 25, the market turned stagnant with some sellers earlier in the day at 42.12½c., which was about ¾c. or 1¼c. below what was considered the market. This sudden drop frightened such buyers as there were and later others became sellers as low as 41.87½c., so that the market closed weak. Today the market has been moderately active with about 200 to 250 tons sold. Spot Straits tin quoted at 41.75c., New York. London quotations were scarcely changed from those prevailing on May 22, with spot standard quoted at £196 15s., future standard at £196 10s. and spot Straits at £200 15s., with the market weak. The spread between spot standard and spot Straits of about £4 is considered normal. Arrivals thus far this month have been 5490 tons, with 3844 tons reported afloat. The opinion of one large importer as to the general market is of interest and is to the effect that, while there is a decrease in new orders among consumers of tin, the consumption will be large during the remainder of the year, but not so heavy in the last half as in the first. Considering the amount of tin here available for consumption and the quantity afloat, it is figured that supplies in June will be stringent with the situation tighter in July, so that premiums may be possible on prompt shipment tin.

Lead.—All reports indicate a quiet market and a featureless one. The flurry in demand which appeared a few days ago has slumped off. This is taken to indicate that consumption of lead has fallen off quite generally, but no one appears willing to admit it. The leading interest continues to quote 7.25c., New York, but independent sellers are obtaining 7.30c., New York, with the St. Louis market firm at 7.05c.

Zinc.—Weakness has again developed in the prime Western market and today June delivery is quoted and has sold at 6.40c., St. Louis, or 6.75c., New York. De-

mand is light. This, coupled with the declining London market, accounts for the lower prices. There are those who point to the fact that zinc recently sold as high as 8c., St. Louis, and they therefore feel that the market will soon go higher and that galvanizers will have to make purchases.

Nickel.—Shot and ingot nickel are quoted unchanged at 29c. to 32c., with electrolytic nickel held at 32c. per lb., by the leading producers. In the outside spot market quotations for shot and ingot nickel are 29c. to 32c. per lb.

Antimony.—The market is unchanged and wholesale lots of Chinese metal for early delivery are quoted as low as 7c. to 7.15c. per lb., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, in wholesale lots for early delivery, is quoted by importers, who can deliver the metal, at 26.50c. to 27c. per lb., New York, duty paid. Open market quotations for the same grade are 26c. to 26.50c., f.o.b. New York. No quotations are made public by the leading producer.

Chicago

MAY 28.—Copper and zinc have declined and the market remains weak, although slightly more active than a week ago. In all of the metals except copper there are offers to sell for distant deliveries at substantial concessions under prompt prices, with practically no takers. Among the old metals copper and brass grades have declined. We quote, in carload lots, lake copper, 16c.; tin, 44c.; lead, 7.10c.; spelter, 6.60c.; antimony, 9c. in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 12.50c.; copper bottoms, 10.50c.; red brass, 8.75c.; yellow brass, 7c.; lead pipe, 5c.; zinc, 4c.; pewter, No. 1, 25c.; tin foil, 29c.; block tin, 35c.; all buying prices for less than carload lots.

The Squeak of Metals and Their Elastic Limit

BETHLEHEM, PA., May 29.—Stretching a metal until it squeaks and listening for the squeak with a microphone will give a test showing how much strain that metal can stand as a girder in a bridge or a rail in a railroad, according to experiments conducted in the physics department of Lehigh University. These experiments will develop a novel method for finding quickly and accurately the elastic limit of metals, the Lehigh scientists expect. By this method all forgings may be rapidly tested before they are put into use.

Several kinds of metals have been used in the Lehigh tests. While professors listened through a sensitive microphone similar to the dictaphone for the faintest sound, the metal was subjected to a gradually increasing pull until it broke. It was found that squeaking, rasping sounds were produced after the pull had reached a certain definite value, and this value was different for the different metals used. The tests indicated that the sounds, caused by grating of the molecules, were not produced until the elastic limit of the material had been reached. The work will be continued with more refined apparatus in the Lehigh physics laboratory, it is expected.

Secondary Metals in 1922

The total amount of secondary metals of certain classes recovered in 1922 amounted to 605,882 net tons, most of which was obtained as a pure metal with the remainder in alloys and salts. There was a large increase in all classes of metals and alloys recovered from drosses, scrap, etc. The imports of scrap, brass and copper were also much larger than normal. According to J. P. Dunlop of the U. S. Geological Survey, the following advance estimates of various metals were obtained from scrap, etc., in 1922: Copper, 129,100 tons; brass, 274,000 tons; total secondary copper, 320,900 tons; total secondary lead, 159,560 tons; total zinc unalloyed, 70,770 tons; tin as pig tin, 6570 tons.

FABRICATED STEEL BUSINESS

Week's Total Awards Still Small—New Inquiries Not Diminishing

The volume of awards last week was still small but they were slightly larger than a week ago, or 7650 tons compared with 6930 tons. Two weeks ago the total was about 10,225 tons. New projects for the past week aggregate about 14,450 tons or not far from the totals for the two previous weeks of 14,080 tons and 15,090 tons respectively. Following are the chief items:

New York City, tunnel shaft, Staten Island, 1200 tons, to Patrick McGovern, Inc., general contractor; steel fabricator unnamed.

Railway Steel Spring Co., Latrobe, Pa., 1350 tons, to McClintic-Marshall Co.

American Car & Foundry Co., crane runways to Madison, Ill., 3000 tons, to the Mississippi Valley Structural Steel Co.

Public School 99, Brooklyn, 250 tons, to the Community Steel Co.

Philadelphia & Reading, coal thawing plant at Port Richmond, 250 tons, to the Belmont Iron Works.

Baltimore & Ohio Railroad, bridge work, 100 tons to the Mt. Vernon Bridge Co.

Belle City Malleable Iron Co., Racine, Wis., core and mill building, 150 tons, to Kenwood Bridge Co.

Northern States Power Co., steel stack.

St. Paul, Minn., 107 tons, to Minneapolis Steel & Machinery Co.

Electrical Engineering Building, University of Minnesota, 192 tons, to Minneapolis Steel & Machinery Co.

Byllesby Engineering & Management Corporation, Chicago, transmission towers in Northwest, 800 tons, to Minneapolis Steel & Machinery Co.

Swine pens, State Fair Grounds, Indianapolis, 250 tons, to Hetherington & Berner.

Structural Projects Pending.

Inquiries for fabricated steel work include the following:

Public Service Corporation, Newark, building extension, 3000 tons.

American Locomotive Co., Schenectady, repair shop, 350 tons.

Lehigh Valley Railroad, transfer bridge at Jersey City, 750 tons (although later information is that the taking of bids has been postponed).

Baltimore & Ohio Railroad, bridge work, 900 tons of recent inquiry for 1000, to be rebid upon after revising of plans is completed.

Union Electric Light & Power Co., East St. Louis, power house extension, 3000 tons.

City of New York, subway under Nassau Street, 5300 tons, Patrick McGovern, Inc., low bidder on general contract.

City of Milwaukee, widening of Folsom Place Viaduct, 500 tons; new bids on revised specifications close June 4. Industrial School, Niles, Ill., 300 tons, bids being taken. Illinois Central Railroad, passenger station, Champaign, Ill., 400 tons.

Missouri Pacific, 140 ft. truss span and miscellaneous material, 200 tons.

State of South Dakota, cement plant, Rapid City, 400 tons.

Power station, Pineville, Ky., 600 tons.

Hotel Jamestown, Jamestown, N. Y., 1500 tons.

Economy of Restoring Old Lifting Magnet

The economics of reviving a worn out electric lifting magnet were recently recounted by F. W. Jessop, president Ohio Electric & Controller Co., Cleveland. The magnet was of an old design, long in use by the Ferro Machine & Foundry Co., Cleveland, but the electrician of the plant, loath to give up an old reliable instrument, made plans to rewind the coil. His estimate of the cost was \$1,000 and of the amount of time, including the making of a pattern and buying a manganese steel casting ground to size and also securing the copper and winding the coil, was two months. The yard boss was then interviewed to figure the labor cost involved. He said it would cost \$20 a day to replace the magnet's work by manual labor. Thus there would be an additional cost awaiting the remaking of the magnet of \$1,000 for fifty working days. The old magnet rewound would apparently cost fully \$2,000, while a new one could be obtained for \$1,500.

RAILROAD EQUIPMENT BUYING

Car Orders Largest in Three Weeks—Locomotive Orders Small—Little Inquiry

Purchases continue moderate. The only item in which purchases or inquiries exceed the previous two weeks has been orders for cars. The total this week has been about 1345 against only 207 in the two previous weeks. Inquiries for cars were small. Only 30 locomotives were ordered this week, with no inquiries reported.

Ford Motor Co. (presumably for the Detroit, Toledo & Ironton) has placed 1000 box cars with the Standard Tank Car Co.

The Bessemer & Lake Erie has placed 500 car repairs with the Greenville Steel Car Co. and 300 cars with the Koppel Industrial Car & Equipment Co.

The Atchison, Topeka & Santa Fe has placed an order with Baldwin Locomotive Works for 30 locomotives.

The Kansas City Southern is inquiring for 500 box cars.

The Illinois Traction System is in market for 100 box and 100 coal cars.

The Southern Pacific is inquiring for 50 stock cars.

The Standard Oil Co. of Indiana is in market for 10 coke cars.

The Chicago & Western Indiana is inquiring for 28 coaches, 1 baggage and 1 combination baggage and coach car.

The Pacific Electric Railway is inquiring for 50 passenger cars.

The Santa Fe is in the market for 4 business cars.

The Florida East Coast has placed 1 dining, 2 mail and 15 baggage cars with the Pullman Co. and 10 caboose cars and 200 underframes with the Mt. Vernon Car Mfg. Co.

The Southern Carbon Co. has placed 25 tank cars with the Standard Tank Car Co.

The New Haven Gas & Light Co. has placed 2 tank cars with the Standard Tank Car Co.

The New York Central will build 5 dining and will repair 100 baggage cars in its own shops.

The Anaconda Copper Mining Co. is inquiring for 24 ore cars.

The Sinclair Refining Co. has placed 10 tank cars with the Standard Tank Car Co.

Fire Brick Rates Declared Unduly Prejudicial

WASHINGTON, May 29.—Railroad rates on fire brick in carloads from Ottawa, Ill., and the Portsmouth, Ohio, and Ashland, Ky., districts to Chicago, and related points, are not unreasonable, but are unduly prejudicial to producers in the Ottawa and the Portsmouth-Ashland districts and preferential of producers in the St. Louis district, says a tentative report made by Examiner Burton Fuller of the Interstate Commerce Commission.

He recommended that the so-called undue prejudice be removed by the establishment of a differential on this traffic from St. Louis district of 75c. over Danville, Ill.-Attica, Ind. The complainants in the case included the Davis Fire Brick Co., the National Fireproofing Co., and others, the Harbison-Walker Refractories Co., having intervened in support of the complaints. The Clay Products Traffic Association of the St. Louis district intervened in opposition to the complaints and assumed the burden of the defense.

The present rate from St. Louis to Chicago is \$2.25 per net ton, while the rate from the Danville-Attica district is \$1.75, making a differential of 50c. but if the recommendation of the Examiner for a 75c. differential is approved, the St. Louis rate will be increased 25c. to \$2.50, assuming that the Danville-Attica rate is not reduced.

The rate on fire brick from the Portsmouth-Ashland district to Chicago is \$3.15 while from Ottawa it is \$1.60.

Fire at the plant of the Shenango Furnace Co., Sharpsville, Pa., May 27, destroyed the machine shop building in which were housed a good many spare parts, but did not reach the power house, and no interruption to blast furnace operations is expected. The damage is estimated at \$30,000 to \$35,000, fully covered by insurance.

PERSONAL

O. C. Martin has resigned as manager for the Nichols Copper Co., Laurel Hill, Long Island, to become associated with the American Smelting & Refining Co. as plant manager at Perth Amboy, N. J. After receiving his degree of A.B. at Indiana University in 1900, Mr. Martin began his business career with the American Smelting & Refining Co. as assistant chemist at the Globe plant, Denver. Until 1914 he continued with that company, working at four different plants, and each time with a promotion. Mr. Martin's last position with the American Smelting & Refining Co. was superintendent of blast furnaces at the Perth Amboy plant, which position he resigned to become a superintendent at the Nichols Copper Co. In 1917 he was chosen works manager of the company, in which position he remained until his recent change. During his 22 years' experience in smelting and refining, Mr. Martin has earned the reputation of being among the ablest non-ferrous metallurgists of the country.



O. C. MARTIN

G. M. Bartley, who has been connected with the sales department of the Cleveland Steel Co., Cleveland, has resigned to devote his time to the Murley Tool & Supply Co., Cleveland, of which he is secretary and treasurer.

W. H. T. Thornhill, for the last 12 years with the Midvale Steel & Ordnance Co. and the Midvale Co., has resigned to accept appointment as manager of sales in the Philadelphia district of the Lancaster Iron Works, Inc., Lancaster, Pa., with offices in the Wesley Building, Philadelphia.

J. E. Hart has been appointed superintendent of production of the Walworth Mfg. Co., Boston. He has been with the company for the past 20 years.

W. H. Weber, Kewanee, Ill., recently was appointed superintendent of iron foundries of the Walworth Mfg. Co., Boston, succeeding C. L. Sprague, resigned.

Walter B. Hopkins, who for several years has been vice-president of the Thurston Mfg. Co., Providence, R. I., milling machinery, has recently withdrawn his interests from the concern and has been succeeded by Robert H. Schafer, Providence.

D. A. Polhemus has been appointed assistant to the president, Pittsburgh Crucible Steel Co., Pittsburgh, succeeding R. W. Light, recently promoted to assistant works manager at the company's plant in Midland, Pa. Mr. Polhemus was graduated from Stevens Institute in 1910 and soon afterward became affiliated with the Carnegie Steel Co., in Pittsburgh. For the past few years he was assistant superintendent of finishing mills at the Clairton, Pa., works of that company.

Earl R. Frost has been elected president and general manager of the National Machinery Co., Tiffin, Ohio, to fill the vacancy caused by the death of his father, Meschek Frost. Gerald R. Ayres and J. H. Friedman were added to the board of directors.

E. W. Lankenau, general foreman of the General Electric Co. plant at Decatur, Ind., has been promoted to superintendent.

J. R. Finkelstein, president Consolidated Steel & Iron Co., St. Louis, has resigned on account of ill

health. He was formerly head of the Hoosier Rolling Mill Co., Terre Haute, Ind., which was recently merged with the Missouri Iron & Steel Co., St. Louis.

Lester N. Selig, assistant to the president of the General American Tank Car Corporation, Chicago, has been appointed vice-president and director of purchases to succeed C. H. Coyle, resigned. R. M. McFarland has been appointed first assistant purchasing agent.

Harold Wyman, managing agent for the receiver of the Rowe Calk & Chain Co., Southington, Conn., has been made assistant to the sales manager of the Russell Mfg. Co., New York, with headquarters at Middletown, Conn., where the plant is located.

J. F. Newman, for the past 11 years purchasing agent of the Weirton Steel Co., Weirton, W. Va., has resigned that position to go into business for himself in Pittsburgh.

T. D. Simpers, formerly manager of the general mill section, industrial department, Westinghouse Electric & Mfg. Co., has been appointed export representative of that department, a position made necessary by the growth of foreign business. For the present J. R. Olnhausen, manager of the textile section, will have supervision of Mr. Simpers' former duties. C. H. Long, formerly manager of the contract section, railway department, has been appointed a section manager, light traction division, railway department, and will have charge of international negotiations and stocks and production schedules of the division. R. W. Soady succeeds Mr. Long.

Sidney H. Hale, formerly vice-president of the Vim Motor Truck Co., Philadelphia, has been elected president of the Denby Motor Truck Co., Detroit.

A. S. More, has been made president of the reorganized Selden Truck Co., Rochester, N. Y. He has been identified with the motor truck industry for some time, having recently been elected president of the Denby Motor Truck Co., Detroit.

George C. Smith, general manager of the Industrial Bureau of the Board of Trade, Baltimore, resigns on June 1 to become connected with the Canton Co. as assistant to the president, Walter B. Brooks. He will be succeeded by H. Findlay French, secretary of the bureau.

George E. Benson has resigned as treasurer National Tube Co., Pittsburgh, to become vice-president of the Union Trust Co., Pittsburgh, in charge of the credit and new business department. Mr. Benson has been with the National Tube Co. since 1899 and its treasurer since 1912. His successor is H. J. Hershman, who is a member of the treasury department force.

Henry M. Lane and A. O. Thomas of the H. M. Lane Co., Detroit, sailed from New York on the Homeric, May 26, on a business trip to Great Britain and France. At Paris they will gather data for the new foundry to be built at the Citroën automobile plant after the design of the H. M. Lane Co.

Charles P. Perin arrived in New York last week after an extended trip to India in the interest of the Tata Iron & Steel Co., returning via London.

Production of Graphite in 1922

The sales of crystalline graphite in 1922 amounted to 1,849,776 lb. This was an increase of 56 per cent as compared with 1921, according to a statement given out by the Department of the Interior through the Geological Survey. The average value of the graphite was 4.6 per lb. in 1922, which was 1.8c. less than in 1921. The quantity of amorphous graphite sold was 2,200 net tons, which was an increase of 19 per cent in comparison with 1921. This quantity represents the sales of only two companies. The Acheson Graphite Co., Niagara Falls, N. Y., reported sales of artificial graphite amounting to 13,031,926 lb. in 1922, an increase of 121 per cent as compared with 1921.

OBITUARY

DR. HANS GOLDSCHMIDT, inventor of the Thermit process for welding iron and steel and for producing high grade metals and alloys, also the originator of many other scientific inventions, died suddenly in Baden-Baden, Germany, on May 20, after a stroke. He was born in Berlin in 1861. His father was the proprietor of chemical works and tin smelters which he had founded in 1847. After having been graduated from the gymnasium of Altenburg, he studied chemistry, physics and natural sciences in general at the universities of Berlin, Leipzig, Heidelberg, Strassburg and at the Institute of Technology at Charlottenburg. He received the degree of Ph. D. from the University of Heidelberg in 1886. In 1887 Mr. Goldschmidt entered the firm of Th. Goldschmidt, Essen Ruhr, Germany, in joint partnership with his brother, Dr. Karl Goldschmidt, and here he devoted himself to research. He visited this country very frequently and was president of the Goldschmidt Thermit Co., now the Metal & Thermit Corporation, from 1904 to 1916.

CHARLES PETTIGREW, formerly superintendent of the Joliet, Ill., works of the Illinois Steel Co., died on May 22 at his winter home in Pasadena, Cal., aged 79 years. He was born in 1844 in the village of New Lanark, Scotland, in the valley of the Clyde. At the age of 11 he began working in a local machine shop. Later he served as apprentice at Scotland Street Iron Works, Glasgow. He came to the United States in 1867, entering the employ of Carlyle Mason in Chicago. In 1870 Mr. Mason sent him to the Union Coal Transportation Co. at Joliet to execute an important mechanical job. The Joliet company liked his work so well that he was induced to remain, and in three years rose to the post of master mechanic. By that time the plant had been rebuilt and renamed the Joliet Iron & Steel Works. In 1889 this plant was consolidated with the Union Steel Co. and the North Chicago Rolling Mill, both of Chicago, under the name of Illinois Steel Co. Shortly thereafter Mr. Pettigrew was made general superintendent of the Joliet Works, remaining in that position until 1896. He then went to Indianapolis to build a mill for the American Steel Co. and from there went to Sparrows Point, Md., as general manager of the Maryland Steel Co. In seven years he practically rebuilt the plant and tripled its output, putting it on a paying basis. In May, 1904, he resigned and for some time made his home at Bridgeport, Conn., latterly residing at Pasadena, Cal. Mr. Pettigrew was the first to adapt the Corliss valve motion to a blowing engine, using this valve motion in the steam cylinders and metal valves in the blowing cylinders. He was a pioneer in using tubular boilers in blast furnace work, also the first to roll rails from the initial heat without an intermediate reheating. He was likewise the first to roll rails in multiple lengths instead of singly. This he accomplished by devising special automatic machinery for serving the rolls. He originated a drag conveyor for taking scrap from the bloom shears and introduced a system for rolling 4 x 4-in. billets on a three-high mill with automatic machinery. Duplex hydraulic shears were devised by him at this time for cutting up the product of this mill and a roller conveyor was provided for taking the billets away from the shears. He collaborated with William Garrett in perfecting the Garrett rod mill. These and other inventions quickly became standard in the industry and contributed to placing the United States foremost in the art of steel making.

GEORGE ADAM RENTSCHLER, president Hooven, Owens & Rentschler Co., Hamilton, Ohio, manufacturer of the Hamilton Corliss engine, died at his home on May 24, aged 77 years. He was born in Germany, coming to America with his parents when three years old. He lived for some time in Newark, N. J. and Peru, Ind., and moved to Cincinnati in 1870, where he entered the foundry business. In 1873 he removed to Hamilton and built the Dauscher foundry, then known as the Variety Iron Works. Later he became president of the Hooven, Owens & Rentschler Co., and in addition was also president of the Hamilton Foundry

& Machine Co., and vice-president of the Phoenix Caster Co.

CAPT. ALEXANDER McDougall, president McDougall-Duluth Co., which during the war constructed a large fleet of steamships for the Great Lakes and for coastwise trade, died at his home in Duluth, Minn., on May 23, having failed to recover from a major operation performed several weeks ago. He was 78 years old. At one time 25 to 30 whalebacks were in operation on the Great Lakes, but there are only two left, most of them having been sent to the East for the coast trade years ago. With the provision of larger ore handling equipment at the lower lake docks and the building of larger lake freighters, the whalebacks, the largest of which had a capacity of only 7000 tons, gradually became obsolete on the Great Lakes.

L. O. KOVEN, senior partner in the firm of L. O. Koven & Brother, Jersey City, and vice-president and treasurer of the Hoevel Mfg. Corporation, died on May 17, aged 63 years.

WILLIAM J. MCCLAIN, member of the firm of Waldo, Egbert & McClain, pig iron, coal and coke brokers, Buffalo, died at his home, 69 Bedford Avenue, on May 22. He was taken ill while attending the foundrymen's convention at Cleveland early in May, and upon his return to Buffalo went immediately to the Homeopathic Hospital. Pneumonia and pleurisy caused his death. Mr. McClain was born in Niles, Ohio, in 1883. His first employment was in the Ohio works of the Carnegie Steel Co. at Youngstown. In 1912 he entered the sales department of the Republic Steel & Iron Co., and one year later was sent to Buffalo as assistant district manager. He continued in this capacity until 1919, when he was appointed branch manager. In March, 1922, Mr. McClain resigned from the Republic Iron & Steel Co. to become a member of the present firm, then in process of organization. Mrs. McClain and a daughter survive.

FRANK E. WING, treasurer L. S. Starrett Co., Athol, Mass., died at his home in that city on May 13, aged 57 years. Mr. Wing was born in Conway, Mass., and was educated in the public schools there and later at Smith Academy. He was graduated from Yale in 1886 with the degree B. A. He came to Athol in 1887 and was employed by the late Laroy S. Starrett as bookkeeper. When the L. S. Starrett Co. was incorporated in 1900 he was made clerk and a director, which offices he continued to hold, together with that of treasurer, since 1912.

CHARLES S. ROBERTS, president Wahl Co., Chicago, manufacturer of mechanical pencils and fountain pens, died in that city on May 22.

Secretary Hoover Favors Amending Sherman Law

WASHINGTON, May 29.—Modification of the Sherman anti-trust act has been suggested by Secretary of Commerce Hoover as a means of assisting business. He proposes that the act should not be repealed but modified in order that trade associations may be required to file with a duly constituted Government agency a program of work they contemplated performing. It was the Secretary's contention that as long as trade associations continue to serve the public interest they should not be molested by the Federal Trade Commission or other Federal organizations.

Mr. Hoover declared that "we are living, however, under undue restraint in our trade activities. The laws now operative were framed at a time when collective action in the form of the trade association of today was unknown."

After citing the functions of such organizations, the Secretary said there is pressing need for collective action and collective strategy if business conditions are to be permanently stabilized.

It is significant to note that the American Wholesale Grocers' Association at its convention here last week was advised by its general counsel, Edgar Watkins, of Atlanta, to work for legislation which would enable the Federal Trade Commission "to put itself in association with business and to aid business," by authorizing it to rule on its own initiative as to the fairness of particular trade practices and ethical codes.

12-HR. SHIFT IN INDUSTRY*

Analysis of Cost of Change to Shorter Hours —
Willingness of Men to Do More per Hour

BY L. W. WALLACE

"A service to others is the expression of the highest motive to which men respond and as duty to contribute to the public welfare demands the best efforts men can put forth, the engineering and allied technical societies of the United States of America, through the formation of the Federated American Engineering Societies, realize a long cherished ideal—a comprehensive organization dedicated to the service of the community, state and nation."

This quotation is from the constitution of the Federated American Engineering Societies, an organization formed, supported and directed by the engineers of the United States in order that they might have an agency through which they may render an essential public service.

It was quite consistent with the purposes of the organization and with the spirit of the engineers supporting it to make a study of the question of the 12-hr. shift in American industry. This question had been for many years warmly discussed. A number of reports had been developed relating to it. But for several reasons there appeared to be much uncertainty pertaining to many aspects of the question. No one had definitely determined the extent to which the 12-hr. shift prevailed in American industry; the fundamental factors to be considered in contemplating a change from a 12-hr. to a shorter length of shift; whether there were any technical difficulties to be overcome before a successful change could be made; the results experienced in those plants where the 12-hr. shift had been changed to a shorter shift.

In characteristic engineering fashion the Federated American Engineering Societies set about to determine the facts and to report those facts as clearly as possible and without coloring. A trained and experienced investigator, an economist, was kept in the field for some 18 months and an eminent metallurgical engineer for six months. Their work was supervised by a committee of engineers. The results of this study, published in book form, may be obtained from E. P. Dutton & Co.

This report discloses that there are more than 40 continuous process industries operating more or less completely upon a 12-hr. shift. They employ between 500,000 and 1,000,000 wage earners on shift work. Their families constitute from 1,500,000 to 2,000,000 persons dependent upon earnings from shift work.

In all of the continuous industries, between one-third and one-half of all workers on continuous operations are on shifts averaging 12 hr. In the iron and steel industry there are approximately 150,000 wage earners on 12-hr. shifts. The total number of wage-earners employed on a 12-hr. shift basis is greater for other continuous industries than for the iron and steel industry.

There has been a marked tendency throughout all industry to reduce the length of shift from 12 hr. to some other basis. In the last six to ten years some industries have entirely abandoned the 12-hr. shift.

To make the change from a 12-hr. to some shorter shift is not so simple and easy as many appear to believe. The committee stated that "if any one fact stands out above the others, it is that the change can not advantageously be made by fiat. Our judgment is that to effect the change suddenly or without adequate preparation is sure to cause lowered production. On the other hand, it is our judgment that, when the change is pre-planned and the cooperation of everyone is enlisted, gains will accrue to every one concerned—to workers, management, owners and the public." Some of the essential factors to be considered are:

1.—Willingness or unwillingness of the men to do more work per hour under the shorter shift. A change from a 12-hr. to an 8-hr. shift basis means an increase of one-half in the number of men employed on con-

tinuous work. Unless there is a large proportionate amount of production per man per hour the cost of production per unit may be materially increased. This is inevitable if the men demand the same total amount of earnings for an 8-hr. shift as they received for 12 hr. Where such a result cannot be obtained the men in many instances prefer the longer shift. They prefer larger earnings to shorter hours. This is especially true of foreigners, and many are foreigners, particularly in the iron and steel industry.

2.—Responsibility of management as expressed in planning, supervision and control. In these there must be a higher quality than usually prevails under 12-hr. shift operation.

3.—Fluctuations in individual earnings and labor costs. Labor costs per unit of production must be kept down. How to do this in face of increased number of workers and probably an hourly rate such that a man may earn as much in 8 hr. as he formerly did in 12 hr. calls for careful analysis, judicious decisions and effective procedure.

4.—Relationship of work periods for shift and for day workers. Under some circumstances this may present a real problem upon the solution of which will depend success or failure. Into this also enters the question of hourly rates. If the shift worker is paid at such a rate as to enable him to earn as much in 8 hr. as he formerly earned in 12 hr., the entire wage base for the day workers may be much disturbed.

5.—Number of working days per week is another consideration that must not be slighted.

6.—Rotation of shifts is an angle of no small consequence. When is the best time, day or night, to change shifts? In answering this apparently simple question many factors and conditions must be considered.

7.—General industrial and economic conditions to determine the most opportune time for making the change. Obviously it would be unwise to make the change when there was a shortage of labor, because where is the additional labor to be obtained? Likewise it would be unwise to make such a change coincident with a disturbed labor condition within the plant or industry, because it would likely contribute to a worse condition, while success depends upon the closest cooperation.

I have dwelt upon the factors requiring careful study, not for the sake of emphasizing the difficulties or to make the wisdom of making a change from a 12-hr. to a shorter shift appear doubtful, but to call attention to the fact that a plant manager cannot over-night decide to change, and issue instructions to do so within 24 hr. The problem is too difficult, complex and far reaching for such a procedure. Success will depend upon the degree of care with which the change has been worked out. The report shows that, in all cases where the problem has been carefully analyzed and procedure wisely planned, success has obtained. In those instances where such circumstances did not prevail failure ensued.

The evidence clearly indicates, when the change has been made after careful consideration, wise planning and close attention given to execution, that the results of changing from a 12-hr. to a shorter shift have been satisfactory to all concerned. The general conclusions to be drawn from this study are:

1.—The shorter shift has resulted in a satisfactory improvement of quantity and quality of production and in a reduction of absenteeism and industrial accidents, where good management prevailed and the cooperation of labor was secured.

2.—In general no economic loss inherently obtains because of such a change, provided management uses discretion, carefully plans and competently administers productive procedure and further provided that labor sincerely and fully does its part.

3.—In general the tendency has been to increase the rate per hour under the shorter shift, so that the daily earnings of the workers are the same as they were before the change. In some instances a compromise was made whereby the workers received an increase in hourly rate sufficient to compensate them for one-half of the number of hours by which the length of the shift was shortened.

4.—The evidence shows that there are no technical processes that prohibit a shorter shift and furthermore the extra time for leisure has in general been used to advantage by the workers.

During the first four months of 1923, exports of tin plate and black plate from the Swansea, Wales, district, totaled 150,000 gross tons, according to a cablegram received by the Department of Commerce from Consul Arthur B. Cooke, Swansea, and established a record for such shipments. Exports of coal for the same period were 2,000,000 tons, a post-war record.

*Address before the National Conference of Social Work, Washington, May 18.

Judge Gary Says Prices Are About Right

(Concluded from page 1548)

to Bible readers; all these are indisputable evidence of the accuracy of that book in historical recitation. Many of the tombs, which in many cases referred to were deep down in the rocks, cannot be discovered or located, but others can be. Abraham, perhaps thousands of years B. C., was, according to the Bible, directed to and did secure a burial lot in the caves of Machpelah at Hebron and he and Isaac and Jacob and their wives were buried there. Consult Genesis again. Hebron is still a substantial place, easily located by the written description. The place of these tombs can be seen, though with some difficulty. Many of the mentioned wells or springs are still in use. The general topography of the country, as described in the Bible, you can verify. Also read Josephus, a historian of the first century. In short, the more we read and study the more we must be convinced of the absolute reliability of the book of books. Much more than all this, the better men we will be, the more grateful we will be and the more anxious to have our country and the affairs of all its inhabitants carried on in conformance to its precepts.

The Long Future

"The late wars seem to have influenced the rank and file of the men of the Near East to pay more attention to the long future. This appears from conversations with the dragomen or the merchants, the financiers or the working people of Egypt and other countries. It may be true that some, perhaps many, of the clergy or priests or teachers have taught or are teaching doctrines at variance with some part of the Bible, particularly the New Testament. Others, of course, are better qualified to speak on this question; but that the influence of the principles of the Bible is now extending all over the world and that it is essential firmly to reestablish peace, prosperity and happiness, cannot be reasonably denied.

"The religious sentiment of the Near East, which seems apparent to a casual visitor, is striking and a hopeful sign for posterity. Indeed, it is in evidence throughout all continents. A token is found in the recent manly statement of President Harding concerning the Holy Bible. His utterances should furnish a theme for many sermons."

Plans of the Ford Motor Co. for Plant at St. Paul, Minn.

WASHINGTON, May 29.—The office of the Chief of Engineers, War Department, has forwarded to the engineer's office in St. Paul details of the Ford Motor Co. plans for a plant at St. Paul. The plans were first filed with the Federal Power Commission. Request has been made for a quick ruling upon the application for license because the Ford company desires to construct immediately manufacturing and assembling building units, which, it is stated, will give employment from 10,000 to 14,000 men, with an annual payroll of approximately \$25,000,000.

The plans were prepared by Stone & Webster, engineers of Boston, under the direction of Chief Engineer Mayo of the Ford Motor Co. The factory will be on the St. Paul side of the Mississippi River, and the power plant will generate 18,000 hp. in four units of 4500 hp. each. It is also proposed to construct a steam auxiliary plant with a capacity of approximately 12,000 hp. to be used when the water power is seasonally reduced. The Ford site occupies 167 acres adjacent to the high dam and cost \$315,000. Negotiations have been completed for suitable railroad connections and street car facilities which will make the factory easily accessible to labor from the twin cities. There is practically no opposition to the Ford plan, as assurances have been given the public utilities that the public will consume 100 per cent of the power. The blue prints show a factory approximately 600 by 1700 feet.

WHOLESALE PRICES STATIONARY

Fuels and Farm Products Decrease in April—
Other Items Increase—Total Advance
11 Per Cent in Year

Wholesale prices in April averaged one point higher than in March, according to information gathered by the Bureau of Labor Statistics, and were 11.2 per cent higher than in April, 1922.

Metals and metal products, as a group, advanced 3.4 per cent during the month, and reached a point 36.3 per cent higher than a year ago. THE IRON AGE composite price for pig iron, at mid-April, was 51 per cent higher than a year ago, and the composite for finished steel was 34.8 per cent higher than in April, 1922.

Index Numbers of Wholesale Prices, by Groups of Commodities
(1913 equals 100)

| | 1920 Peak | 1922 April | 1923 March | 1923 April | Advance in One Year, Per Cent |
|--------------------------------------|--------------|---------------|---------------|---------------|-------------------------------------|
| Farm products..... | 247 | 129 | 143 | 141 | 9.3 |
| Foods | 248 | 137 | 143 | 144 | 5.1 |
| Cloths and clothing... | 346 | 171 | 201 | 205 | 19.9 |
| Fuel and lighting..... | 281 | 194 | 206 | 200 | 3.1 |
| Metals and metal prod- ucts | 203 | 113 | 149 | 154 | 36.3 |
| Building materials... | 300 | 156 | 198 | 204 | 30.8 |
| Chemicals and drugs... | 213 | 124 | 135 | 136 | 9.7 |
| Housefurnishing goods... | 275 | 175 | 185 | 187 | 6.9 |
| Miscellaneous | 208 | 116 | 127 | 126 | 8.6 |
| All commodities..... | 247 | 143 | 159 | 159 | 11.2 |

Dispute as to Rail and Water Rates

BIRMINGHAM, ALA., May 22.—Warrior River barge line traffic is in an acute position pending further action in the plea of the waterways management for larger proportion of the through rail and water rates than is now accorded the river. The result of the present division is that the Warrior loses on many commodities and its deficit is the greater according to the business done in such commodities. The Interstate Commerce Commission declared generally for a more liberal division, but suggested conferences with the rail carriers for their establishment before coming to the commission as last resort. The carriers have partly yielded, but not definitely, and, pending rate adjustment, the ports of Tuscaloosa, Cordova and Demopolis on the Warrior have been embargoed, Birmingham's port of entry, being excepted. Coal, iron and steel will continue moving and are revenue producers. The Tennessee company will soon have in service its own steel barges, built especially for the Warrior. They will be leased to the river management.

Wages of Blast Furnace Workers

WASHINGTON, May 18.—The Bureau of Labor Statistics, Department of Labor, has just presented figures giving wages and hours of labor for employees at blast furnaces in 1922. The figures were collected in the fall of the year, mostly in October, and cover 32 representative plants. Figures for earlier years are drawn from preceding reports of the Bureau. The figures disclose that as a whole average earnings per hour in 1922, as compared with 1920, show a decrease of 33 per cent, as compared with 1913, an increase of 91 per cent and as compared with 1910 an increase of 120 per cent. Relatively, the changes in average full time weekly earnings approximate those of hourly earnings. Average customary full time hours in 1922 show no change from 1920 and a decrease of 9 per cent from 1910.

The Franco India Trading Co., 10 Cawasji Patel Street, Bombay, India, offers to help any representative readers or advertisers of THE IRON AGE to learn the situation in India and generally to assist in any business matters. The company further offers to assist anyone who is seeking business information or is desirous of making adjustments.

Iron and Steel Exports Best Since June

April Movement 13,551 Tons Above March, and Well
Above 1922 Average—About 5 Per Cent of Our
Finished Steel Production Shipped Abroad

WASHINGTON, May 29.—Maintaining their upward trend, exports of iron and steel products in April totaled 177,471 gross tons, valued at \$20,146,346, an increase of 13,551 tons over March with a total of 163,920 tons. The foreign shipments for April of this year were considerably under those for the same month of last year, when they amounted to 198,830 tons, but

a value of \$435,418, as against 4946 in March, with a value of \$416,109.

For the single month and for the ten months ending with April of the present year the figures show that Canada again has become the leading export market for the American iron and steel industry. At the same time they reveal the fact that Japan again is an active buyer, though not on so great a scale as when that country was in first position as a recipient of steel

Metal Working Machinery Exports

| | March, 1923 | | April, 1923 | |
|---|-------------|-----------|-------------|-----------|
| | Quantity | Value | Quantity | Value |
| Lathes | 85 | \$57,728 | 81 | \$66,001 |
| Boring and drilling machines | 237 | 47,543 | 131 | 107,432 |
| Planers, shapers, and slotters | 18 | 10,786 | 14 | 20,554 |
| Bending and power presses.. | 19 | 7,850 | 26 | 4,142 |
| Gear cutters | 7 | 11,199 | 11 | 9,724 |
| Milling machines | 23 | 32,774 | 19 | 26,320 |
| Thread-cutting and screw machines | 54 | 39,991 | 42 | 27,362 |
| Punching and shearing machines | 27 | 7,724 | 69 | 10,235 |
| Power hammers | 49 | 24,791 | 19 | 8,168 |
| Rolling machines | 2 | 4,038 | 3 | 1,096 |
| Sharpening and grinding machines | 1,639 | 101,072 | 3,073 | 69,678 |
| Chucks, centering, lathe, drill and other metal-working tools | 1,953 | 20,847 | 2,833 | 25,800 |
| Pneumatic portable tools..... | 833 | 49,766 | 817 | 58,906 |
| Total | 4,946 | \$416,109 | 7,138 | \$435,418 |

with a value of only \$17,549,618. For the ten months, however, ending with April of this year, the exports of 1,441,757 tons, valued at \$155,927,423, showed a substantial increase over exports for the corresponding period of last year when they totaled 1,268,931 tons, with a value of \$144,975,908.

Exports of machinery in April, valued at \$23,394,254, were almost \$1,000,000 less than they were in March, when they were valued at \$24,300,160. Exports of machine tools in April totaled 7138 in number, with

Exports of Iron and Steel Products by Countries of Destination

| | Gross Tons | |
|-----------------------------------|-------------|------------------------------|
| | April, 1923 | Ten Months Ended April, 1923 |
| Galvanized Sheets | | |
| Canada | 4,536 | 25,998 |
| Cuba | 1,198 | 6,576 |
| Mexico | 905 | 4,886 |
| Columbia | 841 | 4,287 |
| Central America | 712 | 3,275 |
| China | 671 | 1,464 |
| Dutch East Indies | 634 | 921 |
| Japan | 500 | 3,067 |
| Australia | 459 | 1,635 |
| Philippine Islands | 299 | 9,229 |
| Plates | | |
| Canada | 13,167 | 67,642 |
| South America | 121 | 890 |
| Black Steel Sheets | | |
| Canada | 5,990 | 44,855 |
| Japan | 3,818 | 24,167 |
| Argentina | 6 | 2,718 |
| Tin Plates | | |
| Japan | 4,046 | 18,452 |
| Canada | 3,726 | 18,394 |
| Italy | 1,171 | 2,266 |
| China | 957 | 1,785 |
| Hong Kong | 775 | 1,232 |
| Cuba | 744 | 2,633 |
| Argentina | 645 | 3,026 |
| Steel Rails | | |
| Japan | 6,118 | 73,442 |
| Cuba | 2,671 | 30,480 |
| Canada | 2,301 | 21,710 |
| Kwangtung (Leased territory)..... | 1,445 | 1,447 |
| Chosen | 943 | 11,669 |
| Galvanized Wire | | |
| Japan | 3,572 | 8,273 |
| Canada | 1,541 | 12,043 |
| Argentina | 577 | 14,009 |
| Australia | 571 | 9,187 |
| Barbed Wire | | |
| Canada | 876 | 4,225 |
| Australia | 863 | 7,738 |
| Brazil | 774 | 11,671 |
| Argentina | 741 | 9,941 |
| West Indies | 702 | 7,572 |

Exports of Iron and Steel—Gross Tons

| | April | | Ten Months Ended April | |
|---|---------|---------|------------------------|-----------|
| | 1922 | 1923 | 1922 | 1923 |
| Pig iron | 2,750 | 1,844 | 22,447 | 27,083 |
| Ferromanganese | 241 | \$1,505 | 925 | 2,935 |
| Ferrosilicon | ... | 88 | 363 | 792 |
| Scrap | 10,599 | 4,571 | 38,332 | 31,893 |
| Ingot, blooms, billets, sheet bar, skelp..... | 9,376 | 11,247 | 36,858 | 90,901 |
| Iron and steel bars..... | 27,814 | 16,251 | 56,562 | 135,785 |
| Alloy steel bars..... | 174 | 96 | 4,270 | 2,204 |
| Wire rods | 6,988 | 3,616 | 33,191 | 17,719 |
| Plates, iron and steel.. | 13,082 | 14,027 | 93,128 | 86,718 |
| Sheets, galvanized | 8,748 | 13,706 | 62,057 | 89,307 |
| Sheets, black steel..... | 29,170 | 10,502 | 240,886 | 79,174 |
| Sheets, black iron..... | 793 | 1,510 | 5,334 | 9,019 |
| Hoops, bands, strip steel | 2,806 | 4,617 | 19,462 | 31,239 |
| Tin plate, terne plate etc. | 4,663 | 13,391 | 64,101 | 63,140 |
| Structural shapes, plain material | 9,978 | 10,131 | 89,092 | 88,327 |
| Structural material, fabricated | 2,632 | 8,471 | 16,659 | 74,481 |
| Steel rails | 17,891 | 17,557 | 172,678 | 190,693 |
| Rail fastenings, switches, frogs, etc... | 3,563 | 2,577 | 15,576 | 29,764 |
| Boiler tubes, welded pipe and fittings.... | 14,652 | 15,059 | 127,550 | 134,613 |
| Cast iron pipe and fittings | 2,361 | 1,810 | 21,982 | 39,879 |
| Plain wire | 12,412 | 8,341 | 59,731 | 69,688 |
| Barbed wire and woven wire fencing..... | 5,666 | 6,772 | 25,747 | 65,519 |
| Wire cloth and screening* | 97 | 78 | 309 | 1,345 |
| Wire rope and cable*.. | 273 | 523 | ... | 4,709 |
| Wire nails | 6,775 | 3,463 | 40,814 | 25,516 |
| All other nails and tacks | 740 | 1,210 | 5,403 | 7,004 |
| Horseshoes | 49 | 40 | 445 | 880 |
| Bolts, nuts, rivets and washers, except track | 1,651 | 1,672 | 11,439 | 15,371 |
| Car wheels and axles†.. | 1,278 | 1,169 | ... | 13,606 |
| Iron castings†..... | 1,091 | 751 | 3,532 | 8,544 |
| Steel castings† | 265 | 431 | ... | 1,816 |
| Forgings† | 237 | 495 | ... | 2,093 |
| Machine screws† | 15 | ... | 58 | ... |
| Total | 198,830 | 177,471 | 1,268,931 | 1,441,757 |

*Not reported separately, prior to January, 1922.

†Previous to January, 1922, reported by value only.

‡Official records indicate this tonnage was spiegeleisen.

exports from this country. Canada led as a foreign export market in April for galvanized sheets, plates, black steel sheets and barbed wire. Japan was the greatest purchaser in April of tin plate, rails and galvanized wire. Study of the exports for April show that, while they still were far below the pre-war average, placed at 230,000 tons monthly, they were distributed over a wide area of the world, including not only North America, Central America and South America, but also the Orient, portions of Asia and Australia. As usual, exports to continental Europe were small.

Steel rails constituted the largest item of export in April, amounting to 17,557 tons, with Japan, the heaviest buyer, taking 6118 tons. Out of the total exports of 190,693 tons of rails for the 10-month period, Japan also was the leading buyer, taking 73,442 tons. Of the rail exports in April, 15,172 tons were 50 lb. per yard and over, while this weight of rail constituted 169,587 tons of the total shipments during the 10 months. Of the 16,251 tons of iron and steel bars exported in April, 15,413 tons were steel bars.

Exports of what apparently was entirely or largely spiegeleisen continued to go to Belgium in April. Ship-

Machinery Exports
By Value

| | April, 1922 | April, 1923 | Ten Months Ended April, 1922 | Ten Months Ended April, 1923 |
|--|----------------|----------------|------------------------------------|------------------------------------|
| Locomotives..... | \$197,654 | \$140,728 | \$17,072,585 | \$4,796,201 |
| Other Steam Engines..... | 144,279 | 88,016 | 1,463,925 | 1,574,398 |
| Boilers..... | 101,166 | 132,201 | 1,297,523 | 1,072,755 |
| Accessories and Parts..... | 311,841 | 282,540 | *843,008 | 2,853,977 |
| Automobile Engines..... | 773,315 | 871,147 | 2,508,040 | 3,846,346 |
| Other Internal Combustion Engines..... | 730,009 | 565,069 | 2,742,858 | 4,045,833 |
| Accessories and Parts for..... | 274,864 | 286,616 | *882,476 | 2,404,601 |
| Electric Locomotives..... | | 320,112 | 1,416,503 | 2,610,224 |
| Other Electric Machinery and Apparatus..... | 168,769 | 304,424 | 5,718,348 | 1,130,766 |
| Excavating Machinery..... | 236,231 | 101,981 | 2,102,204 | 1,210,718 |
| Concrete Mixers..... | 81,462 | 66,951 | 326,395 | 457,154 |
| Road Making Machinery..... | 28,014 | 68,836 | *103,461 | 342,991 |
| Elevators and Elevator Ma- chinery..... | 223,747 | 210,399 | *703,487 | 2,040,128 |
| Mining and Quarrying Ma- chinery..... | 467,641 | 743,190 | 4,229,941 | 6,436,702 |
| Oil Well Machinery..... | 491,160 | 534,467 | *1,357,339 | 3,989,359 |
| Pumps..... | 503,867 | 596,568 | 4,647,014 | 5,494,395 |
| Lathes..... | 45,606 | 66,001 | 894,375 | 585,144 |
| Boring and Drilling Machines.. | 25,280 | 107,432 | *197,024 | 505,561 |
| Planers, Shapers and Slotters.. | 25,685 | 20,554 | *78,110 | 201,882 |
| Bending and Power Presses.... | 644 | 4,142 | *191,988 | 133,141 |
| Gear Cutters..... | 2,091 | 9,724 | *13,976 | 116,025 |
| Milling Machines..... | 17,591 | 26,320 | *81,768 | 371,571 |
| Thread Cutting and Sere- Machines..... | 13,178 | 27,362 | *51,877 | 257,757 |
| Punching and Shearing Ma- chines..... | 8,700 | 10,235 | *63,254 | 109,379 |
| Power Hammers..... | 5,673 | 8,168 | *39,398 | 121,996 |
| Rolling Machines..... | 221 | 1,096 | *7,649 | 145,105 |
| Sharpening and Grinding Ma- chines..... | 67,804 | 69,678 | 680,107 | 752,270 |
| Other Metal Working Ma- chinery and Parts of..... | 385,716 | 343,170 | 5,860,255 | 4,651,482 |
| Textile Machinery..... | 1,598,124 | 793,419 | 14,562,895 | 8,241,726 |
| Sewing Machines..... | 420,988 | 541,240 | 4,532,097 | 6,897,338 |
| Shoe Machinery..... | 53,393 | 93,881 | 835,746 | 968,770 |
| Flour-Mill and Gristmill Ma- chinery..... | 201,960 | 88,227 | 858,635 | 920,330 |
| Sugar-mill Machinery..... | 80,940 | 146,920 | 3,713,461 | 3,318,454 |
| Paper and Pulp Mill Machinery | 117,690 | 252,898 | 2,236,569 | 1,749,361 |
| Sawmill Machinery..... | 25,007 | 40,500 | 513,300 | 497,321 |
| Other Woodworking Machinery | 110,063 | 123,712 | 894,217 | 1,258,595 |
| Refrigerating and Ice Making Machinery..... | 80,011 | 220,626 | 1,522,823 | 1,676,150 |
| Air Compressors..... | 166,938 | 205,039 | 1,464,096 | 2,089,565 |
| Typewriters..... | 857,706 | 1,504,916 | 8,246,914 | 10,532,336 |
| Power Laundry Machinery..... | 38,501 | 103,625 | 441,749 | 779,061 |
| Typesetting Machines..... | 454,141 | 271,549 | 2,608,358 | 3,057,586 |
| Printing Presses..... | 372,691 | 290,692 | 4,200,514 | 3,518,502 |
| Agricultural Machinery and Implements..... | 2,076,518 | 3,982,878 | 16,673,157 | 28,515,003 |
| All Other Machinery and Parts.. | 7,208,901 | 8,727,006 | 84,253,179 | 83,160,508 |
| Total..... | \$19,205,382 | \$23,394,254 | \$203,132,598 | \$209,458,467 |

*Jan. 1 to April 30, 1922 only.

Exports, January, 1921, to April, 1923, Inclusive

| | Gross Tons | | |
|--------------------------|-----------------------|-------------|---------------------------|
| | All Iron and Steel | Pig Iron | Semi-finished Material |
| *Average, 1912 to 1914.. | 2,406,218 | 221,582 | 145,720 |
| *Average, 1915 to 1918.. | 5,295,333 | 438,462 | 1,468,026 |
| Calendar year 1919..... | 4,239,837 | 309,682 | 258,907 |
| Fiscal year 1920..... | 4,212,732 | 248,126 | 288,766 |
| Calendar year 1920..... | 4,961,851 | 217,958 | 216,873 |
| January, 1921..... | 547,394 | 3,710 | 315 |
| February..... | 393,328 | 1,307 | 92 |
| March..... | 230,635 | 2,320 | 1,023 |
| April..... | 162,592 | 1,234 | 678 |
| May..... | 142,551 | 2,541 | 749 |
| June..... | 119,081 | 1,689 | 1,106 |
| Fiscal year 1921..... | 4,168,619 | 129,541 | 82,549 |
| July..... | 86,523 | 2,744 | 363 |
| August..... | 75,827 | 2,424 | 2,447 |
| September..... | 95,169 | 3,078 | 1,318 |
| October..... | 106,582 | 2,830 | 1,153 |
| November..... | 125,511 | 1,299 | 1,869 |
| December..... | 134,415 | 2,550 | 250 |
| Calendar year 1921..... | 2,213,042 | 28,305 | 10,363 |
| January, 1922..... | 160,920 | 1,043 | 4,683 |
| February..... | 133,975 | 1,430 | 6,627 |
| March..... | 208,843 | 2,724 | 10,002 |
| April..... | 198,830 | 2,750 | 9,376 |
| May..... | 230,062 | 3,897 | 13,091 |
| June..... | 212,295 | 1,996 | 13,178 |
| Fiscal year 1922..... | 1,721,418 | 28,330 | 63,127 |
| July..... | 157,169 | 1,943 | 10,149 |
| August..... | 145,640 | 1,791 | 9,353 |
| September..... | 129,475 | 5,203 | 6,810 |
| October..... | 132,924 | 1,553 | 8,364 |
| November..... | 127,782 | 3,464 | 7,157 |
| December..... | 150,170 | 3,136 | 8,449 |
| Calendar year 1922..... | 1,986,297 | 30,922 | 107,201 |
| January, 1923..... | 123,190 | 2,482 | 10,563 |
| February..... | 133,902 | 2,786 | 7,733 |
| March..... | 163,920 | 2,881 | 11,416 |
| April..... | 177,471 | 1,844 | 11,247 |
| Ten months..... | 1,441,757 | 27,083 | 90,901 |

*Calendar years.

ments credited to ferromanganese and spiegeleisen by the Bureau of Foreign and Domestic Commerce totaled 1505 tons, valued at \$49,779. Of this shipment, 1503 tons went to Belgium from the Philadelphia district, while the remaining 2 tons went to the Philippine Islands from San Francisco.

While the total machinery exports for 10 months showed little change—\$209,458,467 this year, compared with \$203,132,598 a year ago—there were considerable changes in some of the items. Steam locomotives fell off 72 per cent, from \$17,072,585 to \$4,796,201; and electrical machinery 80 per cent, from \$5,718,348 to \$1,130,766. Textile machinery decreased more than \$6,300,000. To offset these, agricultural machinery led the list of increases, with nearly \$12,000,000 above the previous year. Exports of typewriters increased \$2,300,000; of sewing machines, about \$2,360,000; of oil well machinery, \$2,600,000; of mining and quarrying machinery, \$2,200,000.

New Southern Rail Rates

BIRMINGHAM, ALA., May 28.—It is expected that by July 1 the new rates on commodities to and from Southern points ordered by the Interstate Commerce Commission to be established by the railroads will go into effect. The new rates from Northern iron and steel producing points to port cities and Birmingham, Atlanta and other inland cities are revised. Birmingham's rate on steel products from Pittsburgh is 69c. It is to be reduced to 58c. New Orleans, Mobile and Pensacola will have the present rate of 51½c. raised to 67c. Atlanta will have present rate of 70½c. reduced to 58c., the same as Birmingham. Memphis will have the present rate of 38½c. raised to 56c. The new arrangement does away with the old "potential" water rates and conforms to the fourth section of the transportation act relating to the long and short haul. Rates from Youngstown, Chicago and other producing points will be changed as those from Pittsburgh. Birmingham's ton rate from Pittsburgh will undergo a reduction of \$2.20.

Malleable Manufacturers Consolidate

Arrangements have been completed effecting the consolidation, subject to the approval of stockholders of the Dayton Malleable Iron Co., Dayton, Ohio, and the Pratt & Letchworth Co., Buffalo. The actual merger is effective June 30, when the Dayton company expects to purchase all assets of the Buffalo concern.

The capacity of the Buffalo plant is approximately 40,000 tons per year and that of the plants already operated by the Dayton company exceeds 50,000 tons. In order to finance the purchase the Dayton company proposes to increase its capital stock from \$2,000,000 to \$6,000,000, one-half of which will be preferred. None of the stock will be offered to the public. It will be absorbed by the present stockholders of both companies.

All officers of the Pratt & Letchworth Co. will be retained with John C. Bradley as chairman of the board.

Limiting Coke Production

UNIONTOWN, PA., May 26.—Furnace coke output in the Connellsville region continues to increase while the foundry coke output is decreasing. The furnace increase, however, was such as to show a net gain for the week of May 19 of the two interests, the total coke output being 298,430 tons.

A more or less determined stand is being taken as the time for third quarter consignments and contracts approaches. The coke interests in the region are reducing their output strictly within the demand. Third quarter contracts, at present indications, will not be made under \$6 for furnace coke. The tendency toward over-production has been definitely checked.

A slight gain is noted in coal production in the region with a little firmer market trend. No big increase in production will be apparent until the prices are more firmly stabilized. Elements of car shortages already are being reported in the region.

FRENCH PRICES MORE STABLE

Price Decline Checked—Production Increases Slowly—Coke Situation Still Serious

PARIS, FRANCE, May 18.—From May 1 to 8, inclusive, 40,800 metric tons of coke, and from May 9 to 15, inclusive, 21,000 metric tons of coke, passed through Ehrang and Aix-la-Chapelle on the way from the Ruhr into France. The reduction during the second period was the result of "sabotage," such as the destruction of railroad bridges, etc., which has affected transportation. During the second quarter of this year a daily average of 5000 to 6000 metric tons of Ruhr coke is expected, unless something serious should occur.

According to French customs returns, France received from March 26 to April 25 the following quantities of coke from various countries:

| | Metric Tons |
|-----------------------|-------------|
| Great Britain | 65,499 |
| United States | 11,030 |
| Belgium | 40,090 |
| Germany | 85,868 |
| Netherlands | 33,896 |
| Czecho-Slovakia | 2,402 |
| Saar territory | 5,204 |
| Total | 243,989 |

France has just concluded an agreement with the Grand Duchy of Luxemburg, according to which 7 per cent of the Ruhr coke obtained by France will go to Luxemburg. The coke supplies of French blast furnaces continue low, and their present production is still only about 60 per cent of the production at the end of last year. There are now 23 furnaces out of a total of 66 in blast in Lorraine, compared with 13 at the beginning of April and 40 in November, 1922. The decline in prices seems to have been at least temporarily checked and an improvement in demand is noted.

Foundry Iron.—Demand is light. The present average price of chill-cast foundry pig iron, No. 3, P. L., is 430 fr. to 450 fr. per metric ton, at furnaces. A month ago, the current quotation was 550 fr. to 575 fr. compared with 250 fr. to 260 fr. at the end of last December. Coke, however, was then worth only 95 fr. per ton, while it is now more than doubled in price. Hematite pig iron is quoted at 470 fr. to 500 fr. per metric ton at furnaces in the East or North. Pig iron produced by the electric furnace process is

worth from 440 fr. to 450 fr. ex-Savoie works. British pig iron is offered f.o.t. French northern ports at 480 fr. per ton for foundry No. 3, G. M. B., and at 490 fr. for East Coast hematite, mixed numbers, but it is not selling well.

Ferroalloys.—Ferrosilicon, 10 to 12 per cent Si, is selling at 640 fr. delivered, for orders of not less than 10 tons.

Semi-finished Material.—Business is restricted. For basic quality, the following approximate prices are now being quoted with open-hearth material at an advance of from 30 to 40 fr. per ton.

| | Fr. Per Metric Ton |
|---------------|-----------------------|
| Ingots | 500 to 520 |
| Blooms | 530 to 550 |
| Billets | 560 to 600 |

Beams.—Prices of beams have almost become stabilized. Large beams are worth 640 to 680 fr. at works in the East and Lorraine.

Rolled Merchant Products.—Production is increasing slowly, but as arrears on contracts are being made up, better deliveries can now be effected. The base price of merchant products has been tentatively fixed at 700 fr. for basic quality at mills in the East or Lorraine; but business is being done at 670 to 680 fr., according to tonnage and specifications. As low as 650 fr. may be reached.

Plates and Sheets.—The following are the average prices on recent transactions:

| | Fr. Per Metric Ton |
|---------------------|-----------------------|
| Plats | 760 to 820 |
| Heavy sheets | 780 to 840 |
| Medium sheets | 880 to 1,000 |
| Light sheets | 1,020 to 1,100 |

British black sheets R. V. C. (mild steel) have been offered, for delivery in June and July, at the following prices f. o. t. French Channel or Atlantic ports:

| | Fr. Per Metric Ton |
|-----------------------|-----------------------|
| 0.42 to 0.45 mm. | 1,479.50 |
| 0.5 to 0.55 mm. | 1,368.50 |
| 0.6 to 1 mm. | 1,284 |

Some export business is reported at lower prices. The following prices (in French currency) are being quoted f. o. b. Antwerp for French products, taking into account the export bounty (based on 25 fr. per metric ton of pig iron) which has just been revived:

| | Fr. Per Metric Ton |
|-------------------------------------|-----------------------|
| Semi-phosphoric foundry pig iron... | 425 to 435 |
| Hematite pig iron..... | 450 |
| Blooms | 550 |
| Round steel bars..... | 700 |

LUXEMBURG LACKS COKE

Not Receiving Quota from Ruhr and Dependent on Imports—Prices Receding

LUXEMBURG, LUXEMBURG, May 9.—The iron and steel situation in the Grand Duchy of Luxemburg did not improve in April. Although the shipments of coke from the Ruhr to France and Belgium materially increased during that month, consumers in Luxemburg received but an insignificant tonnage of German coke, about 7800 tons for the whole month, according to one report. According to an old agreement, they should receive 19.24 per cent of the tonnage of German coke forwarded to France, or 26 per cent of the total for both countries. The consequence is that no blast furnace has so far been blown in, contrary to what could be done in France, and the country is still dependent upon the irregular arrival of British and American coke, supplementing very small supplies from Belgium. At present there are 19 furnaces in blast out of a total of about 40.

Purchasers of iron and steel in Luxemburg, encouraged by an exaggerated optimism as to the near future, are refraining from buying and as a result prices are gradually receding. It seems, however, that normal requirements are exceeding the present volume of production and consumers who are deferring their purchases may be confronted with much higher prices when they come into the market.

Present prices of Luxemburg products f.o.b.

Antwerp (in Belgian currency) are approximately as follows per metric ton:

| | Fr. Per Metric Ton |
|-----------------------|-----------------------|
| Basic pig iron | 525 |
| Blooms (basic) | 635 |
| Billets (basic) | 650 |
| Merchant bars | 725 |
| Beams | 700 |
| Hoops | 825 |
| Wire rods | 925 |
| Rails | 750 |

Final Transfer of Land to the Jones & Laughlin Steel Corporation

Recent transfer of 441 acres of land at Hammond, Ind., to Adelaide Land Co., a subsidiary of the Jones & Laughlin Steel Corporation, concludes a transaction which has been pending for several months. The Jones & Laughlin Steel Corporation purchased this land several months ago from the East Chicago Land Co., but the latter was unable to give a clear title to the property because the State of Indiana interposed with a claim that the land was State property. The East Chicago Land Co., having adjusted the matter with the State of Indiana, was placed in the position of being able to give a clear title.

It is officially stated in Pittsburgh that plans for new steel works on the site are not yet on paper and actual construction work is not expected to be started until there has been a decision on the Pittsburgh basing point case now under hearing before the Federal Trade Commission.

STRIKES IN BELGIUM

Transportation Affected at Antwerp—Foreign Iron Offered at Lower Prices

ANTWERP, BELGIUM, May 9.—Several strikes of post, telegraph and railway officials have broken out in different parts of the country since the end of last week.

[Our British cable last week said the railroad strike was settled.] The movement up to this time has been greatest in Antwerp. The carriage of goods has been stopped at the harbor and freight stations since last Saturday, and postmen left their work yesterday. This situation has suddenly caused a considerable commercial disturbance. The cessation of labor is, therefore, quite general at the harbor.

Ships arriving with cargoes which have to be forwarded by rail have to discharge on the docks and into lighters. In a few days hundreds of lighters have been changed into floating warehouses and the docks are becoming more and more congested. Furthermore, no goods are arriving at Antwerp from other parts of the country, so that a large number of steamers cannot load with their return cargoes and have to leave the port on ballast. The large quantities of coal arriving from England are also held up at the port, and if the consumer cannot receive it by water it is put into lighters and held pending a clearing in the situation. Conditions, although critical, have not yet seriously affected inland consumers, but if the importation of British coal should become more difficult, the inland coal market would finally be very much influenced.

Coke prices are unchanged. It is expected, how-

ever, that before long prices will have to be reduced unless there is a decrease in the coal and coke coming from the Ruhr or the railroad strike continues longer than expected.

The market for iron and steel is calm. Business is dull, especially for export. Consumers and merchants expect still lower prices, and it is only by making concessions that makers can obtain orders. Larger quantities of foundry pig iron are available. Furthermore, owing to the larger quantities of coke received from Germany, Lorraine and Luxemburg works are again offering pig iron on the Belgian market at lower prices. High phosphorus foundry iron is being sold at 510 fr. to 520 fr., or at current exchange, \$29.40 per metric ton delivered at consumers' works. Neither English nor Scotch foundry is, therefore, finding buyers, and steel works also expect to be able to buy English hematite at lower prices.

The following are prices of iron and steel, f. o. b., works:

| | Per Metric Ton |
|---------------------------------------|----------------|
| Commercial iron No. 2..... | 650 \$37.40 |
| Commercial iron No. 3..... | 675 38.60 |
| Commercial iron No. 4..... | 800 45.50 |
| Heavy sheets..... | 725 41.50 |
| Thin sheets..... | 1,100 63.00 |
| Commercial bars..... | 700 40.00 |
| Rails: 1st quality..... | 675 38.60 |
| 2nd quality..... | 575 32.80 |
| Heavy beams..... | 675 38.60 |
| Open-hearth steel: Usual quality..... | 675 38.60 |
| Rounds..... | 1,275 73.00 |
| Spring steel: Usual quality..... | 1,200 68.50 |
| Highest quality..... | 1,300 74.40 |
| Basic ingots..... | 500 28.60 |
| Blooms..... | 550 31.40 |
| Billets..... | 625 35.75 |

Luxemburg and Lorraine works are offering semi-finished products as follows:

| | Per Metric Ton |
|--------------------|----------------|
| Thomas ingots..... | 525 \$30.00 |
| Blooms..... | 550 31.40 |
| Billets..... | 625 35.75 |

BUILDING STOPPED

Serious Conditions in New York Owing to Strikes—Banks Adopt Conservative Policy

As the building situation has become serious in New York owing to demands of labor unions, banks are adopting a policy to check speculative building. Commitments already made are being carried through, but mortgage and insurance companies are making new loans cautiously, if at all. James W. Thair, treasurer Lawyers Mortgage Co., states that loans for new buildings have practically ceased. Instability of the building market is given as the cause. It has become impossible for a constructor to say what a building will cost or when it will be finished. Hence to avoid speculation and also to be safe, further loans are being refused.

Masonry work on \$150,000,000 of construction work has stopped, and bricklayers whose strike started May 21, have announced their purpose to break up the Mason Builders' Association. A few employers under pressure from proprietors who threatened to continue the work themselves reached terms with the strikers. More than 60 projects in all were halted by the move, and the union balked at arbitration. Agreements between two large contracting firms and the international unions dating back many years had no meaning to the strikers, who simply ignored them. A. J. Fogarty, chairman of the bricklayers' executive committee, explained the union's refusal to arbitrate by asserting that it would be impossible to find an arbitrator who had not been influenced by "employers' propaganda."

Ostensibly, the purpose of the strike is a \$12 day, but the bottom notion points to the establishment of the \$12 peak rate as the standard for two years. The bricklayers believe that they can exact their demands. The Mason Builders' Association has reaffirmed its desire to arbitrate. Though not unexpected by the builders, the abrupt action on the part of the workers was taken as an act in bad faith and with total disregard for public needs.

William J. Bowen, president International Bricklayers' Union, upon his arrival in New York, insisted

upon having the workers under agreement abide by those agreements and return to work. This affects two builders. While the factions are deadlocked, the curtailment in building loans goes further in effect than merely to check large jobs. Some 5000 home builders are said to be struck by the curb on loans. However, in the opinion of Franklin D. Roosevelt, chairman of the Construction Council, building will go ahead faster with the market cleared of speculators.

As the situation now stands, three views appear: The bricklayers, stubborn in their demands, are determined to hold out until those demands are granted; the builders, though anxious to complete projects now under way, look forward to July 1 when the demand for bricklayers will have lessened and when they will be in a more conciliatory mood; financial interests, aiming at the safe side, regard the break as a measure in cutting down speculative building and in hastening the return to normal conditions.

Technical Steel Problems Considered

WASHINGTON, May 29.—Various technical problems in the iron and steel industry which are being studied by the Bureau of Standards were discussed at a joint meeting of the ferrous metals advisory committee to the bureau and the metals committee of the Federal Specifications Board held at the bureau on May 18.

A number of proposed Federal specifications for iron and steel products also were discussed, members of the bureau's staff told of the work being done in the laboratories, and visiting members of the committees offered suggestions as to problems, the solution of which is needed by the industry.

The ferrous metals advisory committee makes semi-annual visits to the bureau, and through this committee the bureau is able to keep in touch with the needs of the industry.

The committee contains representatives from the American Institute of Mining and Metallurgical Engineers, the American Society for Testing Materials, the American Society of Steel Manufacturers, American Society of Steel Treaters, American Foundrymen's Association, and Society of Automotive Engineers.

New Type of Open-Hearth Reversing Valve

(Concluded from page 1561)

located on the operating floor. The position of the two levers, one for each valve, indicates the direction of the current to and from the furnace. This switch has indicating lights which show through which valve the ingoing air and gas are passing.

When reversing the furnace, both levers at the master control are thrown at once, but the valve through which the air and gas are passing to the furnace operates first. By means of the crank movement and assistance of the spring counter-balance, the brick-lined hood structure is gently lifted and the cover over the gas inlet automatically shuts off the fresh gas supply before the seal is broken between the base and hood structure. During the time the seal is broken, air is permitted to enter the gas regenerator, replacing the fresh gas therein, which is drawn into the furnace by the action of the white hot end walls and furnace ports. When the reversal of the ingoing valve is nearly completed an electric circuit is automatically formed

which starts the reversal of the outgoing valve. The time interval thus allowed, approximately 6 sec., permits all the fresh gas to be consumed, affording considerable saving of fuel and preventing any chance of explosion.

To center the furnace, the lever at the master control, governing the ingoing valve, is placed in the outgoing position and the ingoing valve only will operate, assuming a corresponding outgoing position whereby all four regenerators are connected with the stack at one time. This is an important feature when starting the furnace or when it is necessary to make quick repairs to the furnace proper. For inspection and cleaning of the base, the hood structure may be stopped at the high position, affording ample space between it and the base. When the furnace is down for repairs, the hood structure may be removed, allowing free access to the underground flues through the terminals. Any soot deposited on the inside of the hood during the flow of fresh gas to the furnace burns off with each reversal and therefore the hoods are always clean on the inside.

Valves of this design are now in operation on open-hearth furnaces having from 35 to 100 tons capacity.

British Iron and Steel Market

Pig Iron Weakening—Galvanized Sheets Easier— Continental Conditions Chaotic from Labor Troubles

(By Cable)

LONDON, ENGLAND, May 26.

Pig iron is weak and makers are anxious to secure new business. No. 3 Cleveland foundry iron is selling at £6 (\$27.72). No. 1 foundry and forge iron are scarce.

Hematite is scarce, with prices unaltered. Foreign ore is dull. Sellers of Bilbao Rubio ask 23½s. to 24s. (\$4.49 to \$4.55) ex-ship Tees.

Finished iron and steel is quiet after the holidays, but prices as yet are unaltered. The works are anxious for forward business and concessions probably could be obtained on suitable lines. Good Continental inquiries will, it is anticipated, result in orders.

The Continental position is chaotic, owing to Belgian labor disturbances. There have been no shipments from Antwerp and stocks are accumulating at the works. The Belgians are soliciting orders, but there is little buying, except by Australia.

In Belgium the Marais plant has been closed. The Société d'Athus-Grivegne at Athus is expected to run for a short time. Other smaller works are discharging workers.

In France the government is seizing Ruhr stocks as penalties. So far, 6000 tons of semi-finished and finished steel have been taken. The Saar miners' strike is over.

There is an improved tone in the tin plate market, with more domestic and export buying. Tin plate for July to August delivery is being sold at 23¼s. (\$5.37) basis, IC, f.o.b. Oil plates are quiet, but third quarter inquiries are expected shortly.

Galvanized sheets are slightly easier, in the absence of substantial demand.

Black sheets are weaker, but buyers are disinclined to commit themselves.

We quote per gross ton, except where otherwise stated, f.o.b makers' works, with American equivalent figured at \$4.62 per £1, as follows:

| | | | |
|-------------------------|--------|-----------|--------------------|
| Durham coke, delivered | £2 4s. | to £2 6s. | \$10.17 to \$10.63 |
| Cleveland No. 1 foundry | 6 10 | | 30.03 |
| Cleveland No. 3 foundry | 6 0 | | 27.72 |
| Cleveland No. 4 foundry | 5 17½ | | 27.14 |
| Cleveland No. 4 forge | 5 15½ | | 26.57 |
| Cleveland basic | 6 0 | | 27.72 |
| East Coast mixed | 6 2½ | | 28.30 |
| Ferromanganese | 18 0 | | 83.16 |
| Ferromanganese* | 20 0 | | 92.40 |
| Rails, 60 lb. and up | 10 0 | to 10 10 | 46.20 to 48.51 |

| | | | |
|--|---------|------------|--------------------|
| Billets | £9 10s. | to £10 0s. | \$43.89 to \$46.20 |
| Sheet and tin plate bars, Welsh | 9 2½ | | 42.16 |
| Tin plates, base box | 1 3¼ | to 1 3½ | 5.37 to 5.43 |
| Ship plates | 10 0 | to 10 10 | 2.06 to 2.17 |
| Boiler plates | 12 10 | to 13 0 | 2.58 to 2.68 |
| Tees | 10 15 | to 11 5 | 2.22 to 2.32 |
| Channels | 10 0 | to 10 10 | 2.06 to 2.17 |
| Beams | 9 15 | to 10 5 | 2.01 to 2.11 |
| Round bars, ¾ to 3 in. | 11 0 | to 11 10 | 2.27 to 2.37 |
| Galvanized sheets, 24 g. | 19 0 | to 19 5 | 3.92 to 3.97 |
| Black sheets, 24 gage | 14 0 | to 14 10 | 2.89 to 2.99 |
| Black sheets, Japanese specifications | 15 5 | | 3.15 |
| Steel hoops | 11 0 | & 13 0* | 2.27 & 2.68* |
| Cold rolled steel strip, 20 g. | 23 0 | | 4.75 |
| Cotton ties, Indian spec- ifications | 15 0 | | 3.09 |

*Export price. †Nominal.

Continental Prices, All F. O. B. Channel Ports, Delivery as Specified

| | | | |
|----------------------|---------|-----------|--------------------|
| Foundry pig iron: | | | |
| Belgium, June, July | £5 15s. | to £6 0s. | \$26.57 to \$27.72 |
| France, June, July | 5 15 | to 6 0 | 26.57 to 27.72 |
| Luxemb'g, June, July | 5 15 | to 6 0 | 26.57 to 27.72 |
| Billets: | | | |
| Belgium, June, July | 7 7½ | to 7 10 | 34.08 to 34.65 |
| Merchant bars: | | | |
| Belgium, July | 7 12½ | to 7 15 | 1.57 to 1.60 |
| Luxemburg, June | 8 12½ | to 8 15 | 1.78 to 1.81 |
| Joists (beams): | | | |
| Belgium, July | 7 10 | to 7 12½ | 1.55 to 1.57 |
| Luxemburg | 8 10 | to 8 12½ | 1.76 to 1.78 |
| ½-in. plates: | | | |
| Belgium, June, July | 8 7½ | to 8 10 | 1.73 to 1.76 |

Drop in April Sheet Sales and Unfilled Orders

April sheet sales of those manufacturers reporting to the National Association of Sheet and Tin Plate Manufacturers declined sharply from those of the previous month, amounting to only 183,904 net tons against 325,526 tons in March. Shipments increased to a much smaller extent, as compared with March, and as production exceeded shipments, a substantial drop in unfilled tonnages and an increase in unshipped stocks are explained. Net obligations of manufacturers, on May 1, the result of deducting unshipped and unsold stocks from unfilled orders, were 437,925 tons, a decrease in a month of 35,551 tons.

The figures in net tons follow:

| | April | March | February |
|--------------------|---------|---------|----------|
| Capacity | 385,000 | 425,000 | 381,000 |
| Capacity reporting | 72.8% | 70.9% | 70.1% |
| Sales | 183,904 | 325,526 | 253,197 |
| Production | 254,808 | 279,475 | 237,919 |
| Shipments | 253,563 | 287,203 | 217,808 |
| Unfilled tonnage | 577,969 | 619,823 | 547,897 |
| Unshipped stocks | 115,577 | 107,263 | 119,237 |
| Unsold stocks | 24,470 | 29,084 | 29,123 |

Etienne Planche, recently resigned chief engineer of the Dort Motor Car Co., Flint, Mich., has opened an office as consulting engineer in the General Motors Building, Detroit.

Machinery Markets and News of the Works

RAILROAD BUYING LOOKED FOR

Sales to Industrial Companies Show Falling Off

Additions to Railroad Lists—Chicago, Burlington & Quincy to Issue List of 50 Items

On the whole buying by industrial companies was lighter during the week, and attention is being focused on the railroads. Sales during May will probably equal those of April but will fall short of the March record. In view of the large amount of pending business it is likely that June will be a very good month.

The Chicago, Burlington & Quincy is expected to issue a list of from 50 to 60 items within a few days, and the Pere Marquette is inquiring for 79 machines for its Grand Rapids, Mich. shops. Both the Union Pacific and Santa Fe have made further additions to

their outstanding lists. The Elgin, Joliet & Eastern and the Denver & Rio Grande Western are expected to place orders soon on their recent lists.

The Navy Department will take bids until June 12 on three heavy-duty engine lathes. Some inquiries are also current for export, but these are generally for single tools. The Williamson Heating Co., Cincinnati, is buying machinery for its new plant, now nearing completion.

The Chicago & North Western Railroad has commenced to close out its list, having purchased ten engine lathes. Five lathes were placed by the United Engineering & Foundry Co., for its Frank-Kneeland plant, Pittsburgh, and the Deming Co., Salem, Ohio, purchased three turret lathes during the week.

Prices remain substantially the same except for an advance of 20 per cent on a line of geared head engine lathes and 10 per cent on a line of shapers. Practically all other standard makes of lathes and shapers advanced a month ago.

New York

NEW YORK, May 29.

THERE has been a fair volume of machine-tool buying in the past week, but with a few exceptions it has been in single machines. The General Electric Co., Schenectady, N. Y., has bought a number of milling machines and other tools and the Central Railroad of New Jersey has closed for six or eight tools for which it recently inquired. The Celluloid Co., New York, has purchased two 30-in. planers. An Eastern builder has received an order from the Pullman Co. for two car wheel borers. The inquiries of the American Locomotive Co. include a dozen or more machines, mostly of the heavy type, such as a driving wheel lathe, planer, slotters, shapers, etc.

The Edison Storage Battery Co., West Orange, N. J., has acquired property adjacent to the new works of the Ford Motor Co., Green Island, N. Y., for the erection of a new plant to give employment to about 300.

The Fox-Goldberg Holding Corporation, 350 Broadway, New York, Charles J. Fox, president, has commissioned Robert S. Kaplan, 56 West 115th Street, architect, to prepare plans for an ice-manufacturing and refrigerating plant, with warehouse, on Washington Street, estimated to cost \$1,000,000.

E. G. Woolfolk & Co., 15 West Thirty-eighth Street, New York, heating equipment, has inquiries out for a motor-driven pipe machine, Saunder type.

The New York Edison Co., 130 East Fifteenth Street, New York, will commence the construction of a three-story power house, 51 x 88 ft., at 49-51 Park Place, to cost \$140,000 including equipment. William Whitehall, 709 Sixth Avenue, is architect.

The Board of Aldermen, New York, has authorized a fund of \$180,000 for the purchase of cars and equipment for a trackless trolley system on City Island and Orchard Beach. Grover A. Whalen, commissioner of plants and structures, Municipal Building, will be in charge.

The Superintendent of Prisons, Capitol Building, Albany, N. Y., is considering the installation of a new ice and refrigerating plant at Sing Sing Prison, Ossining. W. Thomas Wooley, Ossining, is engineer.

The Atlantic Enameling & Japanning Co., 398 First Avenue, New York, has inquiries out for a gas oven and auxiliary equipment.

F. E. Amthor, 715 Lincoln Place, Brooklyn, manufacturer of precision instruments, has leased a portion of the building at 309-29 Johnson Street, for a new plant.

Motors, conveying machinery and other equipment will be installed in the new factory of the Butts Lithograph Co., 424 West Thirty-third Street, New York, near the Queens Boulevard, Elmhurst, L. I., formerly the plant of the Newtown Tire Co.

The Lee Rubber & Tire Corporation, 61 Broadway, New York, has acquired the plant and business of the Republic Rubber Co., Youngstown, Ohio, manufacturer of tires and rubber products. Plans are being arranged for the organization of a new company under Ohio laws and expansion of the plant. The purchasing company has arranged for an increase in capital from 150,000 to 300,000 shares of stock, no par value, a portion of the proceeds to be used for the acquisition and extensions. John J. Watson is chairman of the board.

The Board of Education, Yonkers, N. Y., is said to be arranging a list of equipment for installation in the proposed addition to the local trade and manual training school, estimated to cost \$125,000.

The Public Service Electric Co., Newark, will build a one-story addition to its machine shop, foot of Duffield Avenue, Jersey City, N. J. A new electrically-operated pumping plant will also be erected at the foot of St. Paul's Avenue, Jersey City. Plans have been completed for a one-story power house on West Street, Bloomfield, N. J.

The Wright Aeronautical Corporation, Paterson, N. J., has acquired the Lawrence Aero Engine Corporation and will merge the property with its plant. Plans have been prepared for an addition to the Paterson works. Charles L. Lawrence, heretofore head of the Lawrence company, will be vice-president of the Wright organization.

William B. Stubbs, 114 West Seventy-ninth Street, New York, is in the market for a low pressure boiler, about 1800 ft. radiation.

The Borough Council, Matawan, N. J., has authorized a call for bids for a steel water tank and tower, 75 ft. high, with capacity of 150,000 gal.

Fire, May 18, destroyed a portion of the plant of the New Jersey Chemical & Rubber Co., Broadway and St. Louis Avenue, Hillside, Newark, with loss estimated at \$75,000, including machinery. It is planned to rebuild.

Frederick & Dommock, North Millville, N. J., will commence the erection of a new plant for the manufacture of glass vials and kindred products, estimated to cost \$50,000, including machinery.

The Hackensack Improvement Commission, Hackensack, N. J., William Schaaf, clerk, will receive bids until June 4 for pumping equipment for the municipal sewerage system, including three electrically-operated pumping engines, with

The Crane Market

While the number of orders for overhead electric and hand power cranes placed this week has not been large, a good volume of inquiry continues, a number of inquiries having been added to those already pending. One of the recent sizable lists of cranes came from the General Electric Co., for Schenectady, N. Y. There is an increased demand for hand power equipment for export. It is in addition to five small cranes that have been pending for several weeks and calls for a total of ten overhead cranes; one 15-ton, three 10-ton, two 5-ton and four 3-ton. A list calling for 30 small cranes, about 1½-ton or 2-ton capacity, is reported to have been issued by Ophuls & Hill, engineers, 112 West Forty-second Street, New York, to equip an ice plant. In addition to these inquiries there is the list of the Baldwin Locomotive Works, Philadelphia, which includes six 70-ton overhead cranes, previously reported and the inquiry of the American Locomotive Co. for two 15-ton, and two 10-ton overhead traveling cranes and two 5-ton single leg gantry cranes, also previously reported. It is reported that the Western Electric Co., will shortly purchase cranes for its new plant at Kearney, N. J. The Cranberry Creek Coal Co., 437 Chestnut Street, Philadelphia, has been receiving bids on an electric revolving crawl-tread tractor shovel with 2-cu. yd. bucket.

Among recent purchases are:

Phoenix Utility Co., 61 Broadway, New York, a 15-ton, 1-motor overhead traveling crane reported to have been purchased from the Northern Engineering Works.

Des Moines Electric Co., Des Moines, Ia., a 7½-ton, 41-ft. span electric traveling crane from the Northern Engineering Works.

United Fruit Co., 17 Battery Place, a 50-ton, 5-motor and two 2-ton, 3-motor overhead traveling cranes for export to Cuba, from the Whiting Corporation.

American Locomotive Co., New York, a 25-ton locomotive crane for use at Chester, Pa., from the Ohio Locomotive Crane Co.

Mohawk Carpet Mills, Amsterdam, N. Y., a 20-ton locomotive crane from the Ohio Locomotive Crane Co.

C. P. Hart, Plainfield, Conn., a used 10-ton, 40-ft. boom Byers locomotive crane from Philip T. King, 30 Church Street, New York.

Toledo Machine & Tool Co., Toledo, Ohio, two 5-ton wall cranes from the Niles-Bement-Pond Co.

Greenville Steel Car Co., Greenville, Pa., a 10-ton, 69-ft. 6-in. span, 3-motor, overhead crane from the Cleveland Crane & Engineering Co.

Donner Steel Co., Buffalo, two line, combination bucket and magnet crane from the Cleveland Crane & Engineering Co.

American Steel & Wire Co., Pittsburgh, a 10-ton, 2-motor, overhead crane for its Shoenberger works, from the Cleveland Crane & Engineering Co.

Lake Sand Corporation, Chicago, a 3-motor bucket handling crane with 3-cu. yd. bucket from the Northern Engineering Works.

Roehm & Davidson, Detroit, a 10-ton, 70-ft. span, 5-motor, overhead traveling crane from the Northern Engineering Works.

motors, switchboards, etc. Lemuel Lozier, Room 3, Bank Building, Main and Mercer Streets, is engineer.

The National Light & Electric Co., 291 Market Street, Newark, electrical and radio equipment, has purchased the four-story building at 57-59 Lafayette Street, totaling 20,000 sq. ft. of floor space, for new works. George Ollendorf is president.

The Board of Education, Bloomfield, N. J., will take bids early in June on a general contract for a one-story manual training and trade school, to be known as the Opportunity School, estimated to cost \$75,000. J. F. Capen, 207 Market Street, Newark, is architect.

The New Jersey Commercial Body Co., 235 Elizabeth Avenue, Newark, has acquired property at 253-67 Frelinghuysen Avenue, 200 x 487 ft., and will have plans drawn for the first unit of a new works to manufacture automobile bodies, to be one-story 100 x 280 ft. W. H. Henderson is president. W. Orrin Bartlett is company engineer.

The Board of Education, Department of Supplies, City Hall, Newark, will take bids until June 5 for equipment for manual training and other service, including sharpening tools, vises, scientific apparatus and supplies, etc. R. D. Argue is secretary.

A steam power house will be built by the Public Service Gas Co., Public Service Terminal, Newark, at its new plant on the Raritan River, near Perth Amboy, N. J., for which plans are being prepared. It will cost \$200,000 with equipment.

The Vanité Products Co., 36-40 East Center Street, Nutley, N. J., was recently organized with capital stock of \$100,000 to manufacture electric novelties and appliances. Plans have been completed for the erection of a new factory on this site, but no contracts have as yet been awarded. Contracts will also be let for the entire equipment. The company's dental and electric appliance includes a motor with flexible shaft and is fitted with chuck and instruments. Franklin Lewis heads the company.

New England

Boston, May 29.

THE month of May in the New England machine tool trade is closing in a disappointing manner, sales the past week showing a further decline. Some encouragement, however, is found in the fact that with the exception of lathes, recent sales have run more to new equipment than used. The recent advance in lathe quotations has resulted in an indefinite postponement of contemplated purchases, the largest of which involved 10 machines wanted by a manufacturer of electrical appliances.

Sales the past week included a pipe machine, a bolt cutter and a squaring machine to the Boston Elevated Railway Co.; inverted press equipment to a Cambridge maker of automobile parts; 8-in. surface grinding equipment to a Worcester machine tool builder; a lathe and a Cincinnati universal grinder to a Jamaica Plain maker of bushings, and other miscellaneous tools. A Holyoke, Mass., company took a large lifting capacity hand crane, and a railroad shop a 7-ton special crane.

Work will start at once on a \$200,000 addition to the turbine room of the South Boston power plant of the Boston Elevated Railway Co.

The Fall River Steam & Gas Pipe Co., Bedford and Sixth Streets, Fall River, Mass., is rebuilding a four-story plant.

Rice, Barton & Fales, 65 Taintor Street, Worcester, Mass., has started work on a new one-story foundry, 36 x 140 ft.

Contract has been awarded by the Resisto Pipe & Valve Co., 262 Bridge Street, Cambridge, Mass., for extensive alterations to its plant.

John Barnard, 171 Newbury Street, Boston, architect, has been engaged by the New England Power Co. to prepare plans for its one-story power house, 60 x 100 ft., at Readsboro.

A permit has been granted for a two-story addition to cost \$35,000 to the power house of the P. & F. Corbin Co., New Britain, Conn.

The plant and machinery of the Rowe Calk & Chain Co., Plantsville, Conn., was sold at public auction last week.

Fire, May 20, destroyed a portion of the machine shop of the Hooker Mfg. Co., St. Johnsbury, Vt., manufacturer of saw sharpeners, etc., with loss estimated at \$25,000 including machinery.

A power house to cost about \$50,000 will be built by the board of directors, at the Connecticut School for Boys, Meriden, Conn. E. S. Boyd is superintendent.

The Star Oil Co., Danbury, Conn., is planning the erection of a new oil storage and distributing plant at Southbury, Conn., to cost about \$60,000 including equipment.

Power equipment, ovens, conveying machinery, etc., will be installed in the five-story baking plant to be erected at Somerville, Mass., by the Great Atlantic & Pacific Tea Co., 150 Bay Street, Jersey City, N. J., estimated to cost \$180,000.

A manual training department will be installed in the three-story high school to be erected at Middleboro, Mass., estimated to cost \$200,000, for which bids will soon be asked on a general contract. Edward I. Wilson, 109 State Street, Boston, is architect.

The Eastern Connecticut Power Co., Hartford, Conn., is disposing of a preferred stock issue of \$1,500,000, the pro-

ceeds to be used for the erection of an addition to the steam-operated electric generating plant at Montville, Conn., and the acquisition of other electrical properties.

The Keystone Mfg. Co., 53 Wareham Street, Boston, manufacturer of toys, etc., is planning for the installation of two power presses and auxiliary equipment.

The Board of Trustees, Norfolk County Agricultural School, Walpole, Mass., has plans for a one-story machine and mechanical shop, 71 x 100 ft. William Chapman, 15 Ashburton Place, Boston, is architect.

The Riverton Paper Co., Winsted, Conn., will install additional machinery at its mill, including power equipment, to increase the capacity about 60 per cent.

A manual training department will be installed in the new high school to be erected at Berlin, N. H., estimated to cost \$250,000, for which plans will be prepared by the Thomas M. James Co., 3 Park Street, Boston, architect.

Manual training equipment will be installed in the high school to be erected at Warren, R. I., estimated to cost \$175,000. Howard K. DeWolf, School Commission, is in charge.

The Allen Wood Working Corporation, 3 East Pope Street, New Bedford, Mass., will build a new two-story plant to cost \$30,000, with machinery. The Z. B. Davis Corporation, 668 Acushnet Avenue, is architect.

The Oxford Paper Co., Rumford, Me., will build an addition to its machine and beater departments and install additional machinery. Other extensions will be made, including a one-story mechanical building, 50 x 215 ft. A conveyor system will be installed. An appropriation of \$750,000 has been arranged for the expansion.

The Northern Paper Box Co., William Street, Everett, Mass., is considering rebuilding the portion of its plant destroyed by fire May 18, with estimated loss of \$85,000 including machinery. Scott Gray is president and general manager.

Ovens, power equipment, conveying and other machinery will be installed in the four-story plant, 75 x 150 ft., to be erected by the Atlantic Biscuit Co., Providence, to cost in excess of \$100,000. The McCormick Co., Inc., 41 Park Row, is architect and engineer.

The Central Maine Power Co., Augusta, Me., has disposed of a note issue of \$600,000, a portion of the proceeds to be used for extensions in power plants and system.

The Aerobelle Co., Worcester, Mass., recently organized with a capital of \$50,000 to manufacture shock absorbers, has plans for the establishment of a new factory. Edward Van Der Pyl is president, and Swan J. Larson, treasurer.

Baltimore

BALTIMORE, May 28.

BIDS are being received by the Delaware State Highway Department, Dover, Del., until June 6, for a one-story machine and automobile repair shop, for State trucks and cars. C. M. Buck is engineer.

Beckerly & Trusler, 614 East Lombard Street, Baltimore, has inquiries out for two 75 hp. motors, 220 volts, 25 cycles, or one 150 hp. motor.

J. M. Barr, 202 North Calvert Street, Baltimore, consulting engineer, is in the market for one belt-driven ammonia compressor, used. Also, for one 50 hp. d.c. motor, 200 volts, 900 r.p.m.

The McDonald Brick Co., Ludowici, Ga., is in the market for a steam locomotive, 9 to 10 tons, standard gage.

The Wyatt Rubber & Chemical Co., 780 North Eutaw Street, Baltimore, recently organized, is making inquiries for can-filling machinery and other equipment. C. M. Wyatt is head.

A lathe, drill press, bench tools and other equipment will be installed in the machine shop of the new building to be erected by the Motor Finance Co., 15 Mount Royal Avenue, Baltimore, to be one and two-stories, estimated to cost \$75,000. R. M. Stein is president.

The Sandhills Power Co., Lakeview, N. C., has plans under consideration for a new steam-operated electric power house at Southern Pines, N. C. John R. McQueen is president.

George M. Bushey & Son, Cavetown, near Hagerstown, Md., are planning to rebuild the portion of their planing mill and wood-working plant, destroyed by fire May 31 with loss estimated at \$25,000, including power and other equipment.

Bids will be received by the Chief of Air Service, Munitions Building, Washington, until June 5, for bolts, rivets, nuts, screws and large quantities of standard airplane utility parts, as set forth in circular 23-204. Bids for similar equipment will also be received on June 11, circular 23-195.

Hoisting and conveying machinery will be installed in the three-story warehouse to be erected by the Richmond, Fredericksburg & Potomac Railroad Co., Broad Street Station, Richmond, Va., to cost \$200,000. Carneal & Johnson, Virginia Railway & Power Building, are architects.

The Thomasville Iron Works, Thomasville, Ga., has authorized plans for rebuilding the machine shops, recently destroyed by fire. A list of equipment will soon be arranged.

The Pigeon River Power Co., Waynesville, N. C., recently organized, has preliminary plans for the construction of a hydroelectric generating plant on the Pigeon River, estimated to cost \$300,000.

The Riverside Lumber Co., Beach, Ga., is in the market for a Mogul type locomotive, 12 to 15 tons, used.

Fire, May 17, destroyed the plant and power house of the Giant Furniture Co., High Point, N. C., with loss estimated at \$150,000 including equipment. It is planned to rebuild.

D. A. Burwell, Stovall, N. C., has inquiries out for machinery, motors and power equipment for a brick-manufacturing plant.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until June 12, for three heavy engine lathes, one set of spare parts for motor and controller, schedule 859.

The Sheril-Green Furniture Co., Statesville, N. C., recently organized, is planning the erection of a new factory, with power house, estimated to cost \$80,000 with machinery. J. L. Sheril and T. L. Green head the company.

The Tom Huston Mfg. Co., Columbus, Ga., is in the market for two lathes, 20 to 24 in., one 20 to 24-in. shaper, drill press, punch and other equipment, used or rebuilt.

The Board of Directors, Caswell Training School, Kinston, N. C., is planning the erection of a new machine and industrial building. An appropriation of \$400,000 has been arranged for this and other structures.

Roy Wright and George Flemister, Rome, Ga., have plans for the construction of a hydroelectric power house on Two Run Creek, near Rome, for service at the Eureka milling plant, recently acquired.

The Southern Mantel Co., Mount Airy, N. C., is planning for the installation of a lathe and other equipment.

H. V. Thompson, Ailey, Ga., is in the market for a shingle machine and bolter, boiler and other power equipment.

D. B. Zimmerman, Somerset, Md., and F. E. Rowe, Jr., Meyersdale, Pa., are organizing a company to operate coal properties at Summit, Md. Plans are under way for the installation of electric power and mining machinery, with hoists, cars, etc., to cost in excess of \$150,000.

A manual training department will be installed in the proposed high school to be erected at Lynchburg, Va., by the Amherst County School Board, estimated to cost \$100,000, for which plans will soon be drawn.

The Poneemah Mills Co., Lexington, N. C., plans the installation of a power house in connection with a new local cotton mill, estimated to cost \$100,000. J. E. Williams and C. A. Mountcastle head the company.

The Bromwell Brush & Wire Goods Co., Lipps Lane, Baltimore, is considering plans for rebuilding the portion of its factory recently destroyed by fire with loss estimated at \$75,000, including equipment.

The Bureau of Yards and Docks, Navy Department, Washington, will take bids until June 25 for refrigerating machinery for the naval station, Pearl Harbor, H. T.

Hardy Rhyne, White, Ga., is in the market for a steam pump and auxiliary equipment for water-pumping service.

The Consolidated Granite Co., Columbia, S. C., recently organized, is planning the installation of a stone-cutting, finishing and polishing plant. Machinery to cost about \$20,000 will be installed. The company will establish headquarters at 635 Elmwood Avenue. C. Joseph Niggel is president.

Manual training equipment will be installed in the proposed high school to be erected at Wendell, N. C., estimated to cost \$75,000.

A one-story power house will be erected by the Southern Worsted Corporation, Greenville, S. C., in connection with a new mill. Lockwood, Greene & Co., Charlotte, N. C., are architects and engineers.

The Virginia & Carolina Mining Co., Winston-Salem, N. C., recently formed with a capital of \$100,000, plans the installation of a power house and pumping plant in connection with smelting works at Sanford, N. C. J. W. Hollingsworth is secretary and treasurer.

The Wilson-Hock Co., City Point, Va., machinery dealer, has inquiries out for two 750 hp. motors, three-phase, 60-cycle, 250 r.p.m.; one 300 hp. watertube boiler, 200 lb. working pressure; three transformers, 2200 volts to 550 volts stepdown, 100 kva.; steel water tower and tank, 40 to 50 ft.

high, 35,000 gal. capacity; and two fuel oil storage tanks, 8000 gal. capacity. . .

The Agricultural and Technical College, Greensboro, N. C., will commence the construction of a power house to cost \$125,000, including equipment.

The Town Council, Walnut Grove, N. C., has disposed of a bond issue of \$100,000, the proceeds to be used for the construction of a municipal electric light and power plant.

The Beck & Gregg Hardware Co., Atlanta, Ga., has plans for a new distributing plant at 64-66 Marietta Street, to cost \$115,000 with equipment.

Pittsburgh

PITTSBURGH, May 28.

MACHINE tool business reflects conservatism of buyers in practically all markets. The largest single order recently placed was for five lathes by the United Engineering & Foundry Co., for its Frank-Kneeland plant, Pittsburgh. This business has been pending for some time. New inquiries are fewer and buyers who have quotations on a number of tools are slow to close, apparently because uncertainty as to what the recent slowing down of general business portends. No further price changes are noted in machine tools.

Two of the largest manufacturers of electrical power equipment recently advanced prices on an average about 10 per cent. On alternating current motors there has been a change of rating from 50 deg. C. temperature to 40 deg. C. temperature rise. A revision of prices, together with the change of rating, produces an increase of about 10 per cent as compared with the former prices and rating.

The American Sheet & Tin Plate Co. has bought a 1500 kw. bleeder type steam turbine for its New Castle, Pa., works and a 500 kw. turbine of the same type for its Martins Ferry, Ohio, works.

Sales of cranes have been few and the inquiry light. Builders of rolling mills and rolling mill equipment also report business quieter, although they are doing some preliminary estimating on a few fairly promising projects.

Completion of the deal for the sale of a large area in Hammond, Ind., to the Jones & Laughlin Steel Corporation, Pittsburgh, it is stated officially, does not carry with it the prospect of an early start on a new steel plant, to which the land ultimately will be devoted.

The Russell Machine Co., machinery merchants, Pittsburgh, Pa., the past week sold a large plate shear, capacity 8 ft. plate 1 in. thick, and a 10 ft. vertical boring mill, for shipment to the South. Sales also included a 10,000 lb. Niles steam drop hammer, for the Chicago district.

Contract has been awarded by the Air Reduction Sales Co., 342 Madison Avenue, New York, manufacturer of oxy-acetylene welding and cutting equipment, to the Hughes-Foulkrod Co., Oliver Building, Pittsburgh, for its new plant at Sharon, Pa., to be one-story, 82 x 120 ft., estimated to cost \$150,000, with equipment.

Ovens, power equipment, conveying machinery and other mechanical equipment will be installed in the new two-story plant to be erected by the Waynesburg Bakery, Inc., Waynesburg, Pa., estimated to cost \$110,000. Charles E. Blair is head.

The Bessemer Gas Engine Co., Grove City, Pa., will commence the construction of two one-story additions, 80 x 180 ft., and 75 x 180 ft. The structures will complete a \$500,000 expansion program begun several months ago.

The Pittsburgh Spring & Steel Co., McCandless Avenue, Pittsburgh, will build a new steel coal bunker, to cost \$65,000 with equipment.

A manual training department will be installed in the new two and three-story high school, 180 x 300 ft., to be erected at Greensburg, Pa., estimated to cost \$250,000, for which bids have been asked on a general contract. M. E. Kressler & Co., 13 Fourth Street, Harrisburg, Pa., are architects.

The Universal Portland Cement Co., Universal, Pa., has acquired 231 acres, with buildings, in the vicinity of its plant, heretofore held by the Carnegie Steel Co., and will use a portion of the property for expansion. Headquarters are at 210 South La Salle Street, Chicago.

C. G. Hussey & Co., 2850 Second Avenue, Pittsburgh, manufacturers of brass and bronze products, have awarded contract to the Ferro Concrete Construction Co., Cincinnati, for a three-story and basement addition, 80 x 220 ft., to cost about \$250,000, with equipment. Later the structure will be increased to seven stories.

H. R. Elcher, 608 Maloney Building, Pittsburgh, machinery dealer, has inquiries out for a locomotive crane.

The Youghiogheny & Ohio Coal Co., Charleroi, Pa., has work in progress on a new tippie at its plant and will install equipment for considerable increased output.

Bids will be received by the United States Engineer Office, Huntington, W. Va., until June 5, for 17 hoisting engines and 17 steel side rocker dump cars, as specified in circular 144.

The Fairmont-West Virginia Coal Co., Robert Y. Brown, president, Grand Central Terminal, New York, will install electrical and mechanical equipment on property recently acquired at Shinnston, W. Va., including hoisting machinery, cars, etc.

A lathe, drill press, grinding machine and bench tools will be installed in the machine shop of the new two-story building, 55 x 120 ft., to be erected by the Smethport Garage Co., Smethport, Pa., to cost \$45,000, for which plans are being prepared by S. T. Graham, 301 Jackson Avenue, Bradford, Pa., architect.

The Blackwood Electric Steel Co., Parkersburg, W. Va., is arranging for the installation of equipment at its new local foundry, now in course of completion.

The American Gas & Electric Co., 30 Church Street, New York, is completing negotiations for the purchase of the West Virginia Water & Electric Co., Charleston, W. Va., and its subsidiary organizations, the St. Albans Power & Light Co., St. Albans, W. Va., and the Dunbar Light & Power Co., Dunbar, W. Va. The new owner plans for extensions in the power plants and system, with installation of additional equipment.

The Pond Creek-Pocahontas Coal Co., McDowell, W. Va., will install additional hoisting machinery and other equipment at its two new local shafts.

The Quaker Coal Co., R. R. Biddle, president, 1015 Chestnut Street, Philadelphia, will install electrical and mechanical equipment at Gilmer, W. Va. E. M. Green, Charleston, W. Va., is construction engineer.

The Virginian Power Co., Charleston, W. Va., is planning for the construction of an addition to its electric power plant in the vicinity of Cabin Creek, W. Va.

The Jeannette Ice & Cold Storage Co., Jeannette, Pa., has plans for a one and one-half story plant, 50 x 100 ft., and will arrange a list of equipment. T. Fisher, president of the Fisher Traffic & Transfer Co., Greensburg, Pa., heads the company.

A manual training department will be installed in the new high school to be erected by the Charleston Independent School District, Charleston, W. Va., estimated to cost \$200,000.

H. W. Prettyman, Inwood, W. Va., is in the market for a roller conveyor, 250 ft. long, with rollers about 2 ft. in diameter.

Motors and other power machinery will be installed by the Philippi Blanket Mills, Inc., Philippi, W. Va., in connection with mill expansion.

The Morrow Coal Co., Bluefield, W. Va., recently organized with a capital of \$500,000, plans for the installation of electrical and mechanical equipment at its properties. J. F. W. Morrow heads the company.

Buffalo

BUFFALO, May 28.

PLANs are being prepared by the Antwerp Light & Power Co., Antwerp, N. Y., for a new hydroelectric power plant on the Indian River, near Philadelphia, N. Y., estimated to cost \$175,000 with equipment. J. Beaumert is president.

The American Radiator Co., Elmwood Avenue, Buffalo, has acquired the plant and property of the Dominion Radiator Co., Ltd., Toronto, for a branch factory. Extensions and improvements will be made in the present works.

Bids will be received by the Commissioner of Public Works, Municipal Building, Buffalo, until June 4, for gate valves for the municipal filter plant. George C. Andrews is engineer, Bureau of Water, Department of Public Works.

Bids will be received by the Board of Education, 1400 Telephone Building, Buffalo, until June 4, for vocational school equipment for installation at the McKinley Vocational School, Elmwood Avenue.

The Power Corporation of New York, Northern New York Trust Building, Watertown, N. Y., is disposing of a bond issue of \$1,000,000, the proceeds to be used for the construction of a hydroelectric power plant at Herrings, N. Y., and for the electrification of the present steam plant at Norwood, N. Y. It will also make extensions in the hydroelectric station at Effley Falls, N. Y., including the installation of additional machinery.

The Baker Mfg. Corporation, Saratoga Springs, N. Y., manufacturer of gray iron castings, etc., is planning the

erection of a one-story addition to its foundry and machine shop, estimated to cost \$100,000 with equipment. J. T. Loree is general manager.

A manual training department will be installed in the high school to be erected at Brewster, N. Y., estimated to cost \$200,000. H. H. Wells, Board of Education, is in charge.

The Buffalo, Rochester & Pittsburgh Railroad Co., Rochester, N. Y., is planning the installation of additional equipment, turntables, etc., at its locomotive and car repair shops, in connection with an improvement program to cost \$1,619,187.

J. E. Embrey, 49 Halsted Street, Rochester, N. Y., operating a machine works, plans the installation of automatic lathes and other equipment.

The Iroquois Gas Co., Buffalo, has secured permission to construct its proposed steel gas holder on Lackawanna Street, and has increased the appropriation for the work to \$500,000, including power equipment.

Manual training equipment will be installed in the two-story high school to be erected at Gardenville, N. Y., estimated to cost \$130,000. G. Morton Wolfe, 1377 Main Street, Buffalo, is architect.

The Western New York Utilities Co., Batavia, N. Y., is disposing of a stock issue of \$560,000, a portion of the proceeds to be used for power plant extensions.

The Standard Oil Co., 26 Broadway, New York, plans the erection of a new oil storage and distributing plant on State Street, Watertown, N. Y., to cost \$50,000.

Manual training equipment will be installed in the new high school to be erected at Marion, N. Y., estimated to cost \$200,000. Plans are being drawn by L. J. Held, 25 Main Street, East, Rochester, N. Y., architect.

The Premier Cabinet Co., 61 Water Street, Jamestown, N. Y., has plans for a one-story addition estimated to cost \$25,000.

The General Casting Co., 577 Tonawanda Street, Buffalo, is planning for the installation of equipment to replace the portion that was recently destroyed by fire. J. Kline is general manager.

Detroit

DETROIT, May 28.

ARRANGEMENTS have been perfected by the Detroit Auto Body Corporation, Penobscot Building, Detroit, recently organized, for the purchase of the plant and equipment of the Andrew C. Sisman Co., Beaufait Street and St. Paul Avenue, heretofore devoted to automobile body production. The new owner will take immediate possession and purposes to install additional equipment. Plans are also under way for the purchase of another plant or the construction of an addition to the present plant. A stock issue of \$7,200,000 has been arranged for the Sisman plant purchase, expansion and general operations. William B. Hurlburt, formerly president of the Hurlburt Motor Truck Co., heads the new organization; Walter Thompson is general manager.

The C. M. Hall Lamp Co., 1035 East Hancock Avenue, Detroit, manufacturer of electric lamps, etc., has plans for a two-story addition, 80 x 172 ft., estimated to cost \$80,000. Baxter, O'Dell & Halpin, 1024 Hammond Building, are architects.

The Pittsman & Dean Co., Farwell Building, Detroit, contemplates the erection of a new ice-manufacturing and cold storage plant to cost \$60,000.

The Dudley Paper Co., 740 East Shiawassee Street, Lansing, Mich., is having plans drawn for extensions and the installation of additional equipment, to cost close to \$50,000. W. C. Dudley heads the company.

A manual training department will be installed in the new senior high school to be erected at Royal Oak, Mich., estimated to cost \$150,000. Frederick T. Lyon is secretary of the Board of Education, in charge.

The Ford Motor Co., Highland Park, Mich., is completing arrangements for the occupancy of a building at Lincoln and Holden Avenues, Detroit, near the works of its affiliated organization, the Lincoln Motor Co., for the manufacture of sedan bodies for Ford cars. The structure totals 83,000 sq. ft., and equipment will be for body production.

Plans are under way for the erection of a new ice and cold storage plant by the Michigan Butter & Egg Co., 701 East Kalamazoo Street, Lansing, Mich., and bids will be asked at an early date. It will cost about \$55,000, including equipment.

The Federal Stamping Co., Holland, Mich., will commence erection at an early date of its one-story addition

on River Avenue, for which plans have been completed. It will cost about \$100,000, including equipment.

Lathes, drill presses, grinding machines and other equipment will be installed in the machine shop in the new three-story automobile service building, 40 x 125 ft., to be erected on Hamilton Boulevard, Detroit, by Kohn & Michelson, 13806 Woodward Avenue, estimated to cost \$65,000. H. J. Farwell, 35 Ford Avenue, Highland Park, Mich., is architect.

Chicago

CHICAGO, May 28.

MACHINE tool buying by industrial companies has shown a further recession and therefore attention is focused on the railroads. The Chicago & North Western has commenced to close out its list, having purchased 10 engine lathes, including three 30-in., four 20-in., two 16-in. and one 14-in. machine. The Chicago, Burlington & Quincy is expected to issue a list of from 50 to 60 items within a few days and word comes from Detroit that the Pere Marquette is inquiring for equipment for its Grand Rapids, Mich., shops. This list, however, has not reached Chicago dealers, as it will be purchased at Detroit. Both the Union Pacific and the Santa Fe have made further additions to their outstanding lists. The Elgin, Joliet & Eastern and the Denver & Rio Grande Western have not yet taken action on their inquiries, although orders are expected to be placed soon.

May sales of local dealers will probably equal those of April, but will fall considerably short of the March record. The present rate of buying is hardly sufficient to warrant profitable operations, but in view of the large amount of pending business, June is expected to be a very good month. Prices remain substantially the same, except for an advance of 20 per cent on a line of geared-head engine lathes and 10 per cent on a line of shapers. Practically all other standard makes of lathes and shapers advanced about a month ago.

Additions to Union Pacific List

One 5-ft. radial drill.
One nibbing and trimming machine.
One spring stripping machine.
One spring banding press.
One 36-in. planer.
One center-drive axle lathe.
One four-carriage journal turning lathe.

Additions to Santa Fe List

One d. c. motor-driven Betts-Bridgford, or equivalent, center-drive journal truing lathe, with four carriages and with swing in gap of 15 in., distance between centers 9 ft. 3 in.
One forging adjusting machine (Walter Stock Adjusting Machine Co., Anniston, Ala., or equivalent) to be adapted to receiving power from a hydraulic service line at 1500 lb. per sq. in. pressure.
One motor-driven metal brake for shaping steel car parts, 10 ft. between housings, capacity to handle $\frac{3}{4}$ in. steel.
One Putnam, or equivalent, motor-driven heavy duty type double end car axle lathe.
One Gisholt or Sellers, or equivalent, Universal tool grinder, arranged for motor-drive.

The Link Belt Co., Chicago, has let a contract for a one-story machine shop, 41 x 170 ft. and 22 x 170 ft., at 327-339 West Pershing Road, to cost \$150,000.

The W. A. Jones Foundry & Machine Co., Chicago, has let contract for a one-story machine shop at 4415-27 West Roosevelt Road, to cost \$50,000.

The National Chemical Co., reorganized under the name of the Chin Chin Chemical Co., 8 South Dearborn Street, Chicago, has had plans prepared for a two-story plant on a 10 acre tract at 138th Street and Ingleside Avenue, Dolton, Ill., to cost \$350,000.

The Sphinx Co., 708 West Madison Street, Chicago, has had plans prepared by Paul Gerhardt, 64 West Randolph Street, for a two-story lithographing plant, 45 x 125 ft., at the southeast corner of Wellington Street and North Oakley Avenue, to cost \$35,000.

The Illinois Publishing & Printing Co., 336 West Madison Street, Chicago, has let contract for a two and one-half story color printing plant, 114 x 214 ft., at 130-132 West Twenty-seventh Street, to cost \$300,000.

The Chicago Motor Coach Co., Chicago, has awarded contract for a one and two-story garage, 212 x 299 ft., at 5201-29 Cottage Grove Avenue, to cost \$126,000.

The Western Shade Co., 2100 South Jefferson Street, Chicago, has let contract for a four-story factory, 85 x 290 ft., to cost \$400,000.

The Tri-City Malleable Casting Co., recently incorporated, has purchased the foundry of the Moline Plow Co. at East Moline, Ill., a two-story structure with 92,000 sq. ft. of floor space. Malleable castings for the automobile, implement and railroad industries will be manufactured. Officers are H. C. Smith, formerly president Danville Malleable Iron Co., president; Frank Mangan, formerly general foundry superintendent National Malleable Castings Co., Chicago, vice-president; E. M. Richardson, formerly general superintendent National Malleable Castings Co., Chicago, secretary-treasurer.

The Eagle Iron Works, Des Moines, Iowa, has let contracts for a machine and structural shop, 80 x 280 ft., between Holcomb, Watson and Oxford Avenues and the Des Moines & Central Iowa Railway. Other buildings to be erected subsequently are a foundry, pattern shop, pattern storage room, heating plant and office building. The entire project will involve an expenditure of \$250,000.

The Arcade Mfg. Co., Freeport, Ill., manufacturer of molding machines, light hardware and toys, has started the construction of an addition, 66 x 192 ft., three stories. The woodworking shop will be transferred to the ground floor and an assembling department and paint shop will be on the second floor. The third story will be used for a warehouse and storage place for materials. In the space being vacated by the woodworking shop, the company expects to install a steam engine and generator which will complete the electrification of the plant.

The Fetzter Mfg. Co., Springfield, Ill., manufacturer of agricultural implements, was recently purchased at auction by William Fetzter of Chicago, who is the original owner of the plant. The machinery in the plant was also sold at auction and will be removed immediately. Mr. Fetzter has announced that he will again put the factory in operation, but has not indicated what products he will make.

The Gallmeyer-Livingston Co., Grand Rapids, Mich., is building a machine shop. The steel for the structure, amounting to 100 tons, is now being erected.

William McCredie, Jr., and Edward E. Ekvall have obtained an option to purchase the W. H. Howell Mfg. Co., Elgin, Ill., manufacturer of sadirons and metal products. Mr. Ekvall for a number of years has been assistant manager of the Woodruff & Edwards Foundry Co., Elgin, while Mr. McCredie was for three years manager of the Canadian Ironing Machine Co., Woodstock, Ont.

The Weaver Mfg. Co., machinist, Springfield, Ill., has broken ground for an addition, 73 x 102 ft., to cost \$20,000.

The Enameled Steel Sign Co., 190 North State Street, Chicago, has purchased property, 163 x 260 ft., on the west side of East Ravenswood Avenue, just south of Peterson Avenue, and is having plans prepared for a factory to cost \$90,000.

Cleveland

CLEVELAND, May 28.

THE volume of machine tool business further declined the past week. Sales were limited for the most part to single machines and no new inquiries of any size developed. The railroad field is now the principal source of activity as local manufacturers are figuring on recent lists from Western railroads. The market in Detroit continues very quiet and the trade looks for little activity from the automobile field for some time. While a leading automobile company recently ordered shipments suspended on some machinery an investigation has revealed that it was made because of a possible change in design and that the buyer has no intention of cancelling the order. The Deming Co., Salem, Ohio, has purchased three turret lathes.

The Rhoda Body & Mfg. Co., Lima, Ohio, has commenced the erection of a new plant which will provide 10,000 sq. ft. of manufacturing space. A boiler house will also be built.

The C. O. Bartlett & Snow Co., Cleveland, has recently taken an order from the General Motors Corporation for a sand handling plant and continuous molding equipment for the foundry of its Saginaw Michigan division, to be used in connection with the continuous molding of piston rings. The Bartlett & Snow company has also taken an order from the Bartlett Hayward Co., Baltimore, for sand handling and motor conveying equipment.

The Chicago-Cleveland Car Roofing Co., Warren, Ohio, will erect an addition.

The Superior Metal Products Co., Elyria, Ohio, is erecting an addition to its plant.

The Pebbles Engineering Co., which recently acquired the

plant of the Akron-Newton Furnace Co., Newton Falls, Ohio, will convert it into a machine shop and will erect a foundry, 75 x 140 ft.

The extension to be built by the American Vitrified Products Co., Lisbon, Ohio, will be four stories, for drying and machinery departments.

The Ohio Stone Co., Portsmouth, Ohio, is erecting an addition. Contract has been placed with the Austin Co., Cleveland.

A new foundry building is being erected by Gohman Brothers & Kohler, New Albany, Ind. The Austin Co., Cleveland, has the contract.

The Whiting Corporation has recently taken orders through its Cleveland office for a 72-in. cupola and 10 cupola charging cars for the Zanesville, Ohio, plant of the Pierce-Butler-Pierce Mfg. Corporation; two 45-in. cupolas of the continuous type for Gohman Brothers & Kohler, New Albany, Ind., and a 23-in. cupola 93 ft. high for the Collinwood High School, Cleveland.

Philadelphia

PHILADELPHIA, May 28.

PLANS have been completed for a one-story machine and repair shop for the University of Pennsylvania, to cost about \$25,000.

The Pennsylvania Equipment Co., Norwood, Pa., machinery dealer, is in the market for a second-hand locomotive, standard gage, about 45 tons, with tractive power approximately 15,000 lb.

A coal conveyor system, machinery for sash and blind manufacture, motors, etc., will be installed in the new one-story plant to be erected by the Chester Lumber & Coal Co., Chester, Pa., on West Seventh Street, estimated to cost \$25,000. Samuel Addis, an official of the company, and associates are organizing a new company with capital of \$250,000, to construct and operate a brick manufacturing plant at Bethel Road and the Baltimore & Ohio Railroad to cost close to \$100,000, with machinery. A power house and machine shop will be built. J. P. Eyre Price, city commissioner, is also an official of the new company.

Fire, May 21, caused by an explosion, destroyed a portion of the meter house of the Public Service Gas Co., Second and Cherry Streets, Camden, N. J., with loss estimated at \$25,000, including equipment. It will be rebuilt.

The Victor Talking Machine Co., Camden, N. J., has plans for a new branch plant on Seventy-seventh Avenue, Oakland, Cal., where a site has recently been purchased. The initial unit will be equipped for parts production and assembling, and is estimated to cost \$250,000 with machinery. Later other units will be built to more than double this investment. J. C. Wicks is general production manager, in charge. The company is planning for the early installation of equipment in the new eight-story addition now being built at the Camden works.

The Philadelphia Commercial Museum, Thirty-fourth Street, has received an inquiry from a company at Pernambuco, Brazil, for American type conveying and other handling machinery for cotton; also, for machinery for sugar mill service.

The Hopewell Products Co., Hopewell, N. J., recently organized with a capital of \$100,000, has secured property on Burton Avenue for a new plant for the manufacture of metal and wooden mechanical toys. Equipment will be installed at an early date. Theodore A. Pierson, Jr., is president and general manager.

The Atlas Portland Cement Co., Northampton, Pa., is concluding negotiations for the purchase of the plant and business of the Western States Portland Cement Co., Independence, Kan. Extensions and improvements will be made in the mill and mechanical departments. John R. Morron is president of the Atlas company.

The Birdsboro Stone Co., Land Title Building, Philadelphia, is planning to rebuild its crushing plant and power house at Birdsboro, Pa., destroyed by fire May 21, with loss estimated at \$250,000 including machinery.

A manual training department will be installed in the new two-story high school to be erected at Tarr, Pa., estimated to cost \$135,000, for which bids will soon be asked on a general contract. H. C. Frank, Second National Bank Building, Connellsville, Pa., is architect.

The Martin-Parry Corporation, York, Pa., manufacturer of commercial automobile bodies, has arranged for the establishment of a branch plant at Pittston, Pa., for the production of standardized bodies for light motor trucks. The company is said to have tentative plans under consideration for the erection of a branch plant at Flint, Mich., to cost in excess of \$100,000, with equipment. J. J. Watson is chairman of the board.

The American Briquet Co., Land Title Building, Philadelphia, will soon take bids for a new plant at Lykens, Pa., with machinery installation for a capacity of 10,000 tons a month. It will cost about \$350,000 with equipment. A power house will be installed. A. D. Parker is president. The structure will replace a plant recently destroyed by fire.

Manual training equipment will be installed in the new two-story high school addition to be erected at Beaverdale, Pa., to cost in excess of \$100,000. Hersh & Sholler, Commerce Building, Altoona, Pa., are architects.

The International Motor Co., Allentown, Pa., manufacturer of automobile trucks, will commence the construction of a one-story machine shop, 50 x 700 ft., to cost about \$50,000.

The Pennsylvania Railroad Co., Broad Street Station, Philadelphia, will install pumping and mechanical equipment for a waterworks and reservoir at Tipton, Pa., estimated to cost \$1,000,000, with machinery.

A power house will be constructed in connection with the new two-story plant to be erected by the New Oxford Shoe Co., New Oxford, Pa., estimated to cost \$200,000. Ward Hoffner is head.

The Weitzel Lumber Co., Germantown Avenue and Sedgley Streets, Philadelphia, has acquired the plant of the Hollinger Planing Mill Co., Chambersburg, Pa. Plans are under way for extensions and improvements in the millwork department, estimated to cost \$125,000, including the installation of power equipment and wood-working machinery.

Manual training equipment will be installed in the three-story and basement junior high school, 190 x 290 ft., to be erected at Torresdale Avenue and Wakeling Street, estimated to cost \$1,000,000. Irwin T. Catharine, Board of Education, is architect.

Milwaukee

MILWAUKEE, May 28.

DEMAND for machine-tools is showing signs of shrinkage, although a fair quantity of business is passing. Major needs of the automotive industries apparently have been satisfied, and buying from this source is now of a scattering character, with orders specifying quick delivery. Purchases on railroad account are disappointingly small, but hopes for substance in business for the coming sixty to ninety days are based on this channel. Manufacturers of patented and special metal-working tools and equipment are generally filled up with orders, some as far ahead as July 1, and manufacturers of metal products and other specialties in numerous cases are proceeding with factory extensions.

The Thurner Heat Treating Co., 126 Ferry Street, Milwaukee, will build a new forge shop and smithy, 48 x 80 ft., at 487 National Avenue, and is inquiring for a small list of miscellaneous equipment. The investment will be about \$20,000.

The Board of Industrial Education, Beaver Dam, Wis., is considering bids on the equipment of a new vocational training school, which temporarily will require only a few woodworking tools, including surfacer, band saws, joiners, lathes and grinders. Later a machine shop will be installed.

The West Bend Equipment Co., capital stock \$75,000, has been incorporated at West Bend, Wis., to manufacture litter carriers and other barn, farm and dairy specialties. M. A. Walter, O. C. Klein and H. E. Regner are the principals. Definite plans concerning production facilities will be given out later.

L. R. Huffmann, Elkhart, Ind., identified with the motor truck manufacturing industry, is the highest bidder at \$76,000 for the plant, equipment and other assets of the bankrupt Barton Axle Co., Barton, Wis. It is his intention to do some retooling and resume operation for the production of motor truck axles for his own needs as well as the commercial market. The plant was built and equipped three years ago at a total cost of more than \$175,000.

The Heilprin Fruit Co., Madison, Wis., will soon be in the market for a large ice machine and engine and other machinery for a new cold storage warehouse, 75 x 150 ft., three stories and basement. Bids on the building will be taken about June 9 by Edward Tough, local architect. The cost is estimated at \$100,000.

The R. J. Schwab & Sons Co., 287 Clinton Street, Milwaukee, manufacturer of heating boilers and furnaces, has plans for a one-story brick and concrete shop addition, 40 x 75 ft., at Reed and Park Streets. It will cost about \$25,000.

The Rohn Auto Renewal Co., 711 Chestnut Street,

Milwaukee, conducting a large repair and service shop for automotive maintenance, has placed contracts for the erection of a new shop, 60 x 160 ft., one story and basement, at Thirty-sixth and Sycamore Streets. The present tool and machine equipment will be supplemented. The Coddington Engineering Co., 290 Third Street, is architect and engineer.

The Ashland Paper Co., Ashland, Wis., has engaged Smith, Reynolds & Brandt, architects and engineers, Manitowoc, Wis., to design two new mill buildings for the preparation and storage of pulp, which will require considerable grinding, hoisting and conveying machinery, tanks, etc. The estimated cost is \$65,000. M. C. Connors is president and general manager.

B. R. L'Hommiedieu, Madison, Wis., is the successful bidder for the plant and other assets of the bankrupt United States Auto Gear Shift Co., Eau Claire, Wis., at \$41,500. He represents a group of Madison and Eau Claire capital which intends to place the plant in operation, manufacturing metal specialties in addition to mechanical gear shifting units for automobiles.

Nelson Brothers & Strom, Racine, Wis., operating a general automotive service business, have moved to new quarters at 3021-3023 Washington Avenue, where additional machine tool equipment is being provided for the production of tools, dies, jigs, fixtures and molds for the rubber industry. Three milling machines, three lathes, one shaper, one 36-in. planer and some smaller tools have been purchased.

The Thilmany Pulp & Paper Co., Kaukauna, Wis., expects to let contracts about June 1 for the construction of a \$50,000 steam generating plant, 60 x 80 ft. It has already purchased three 500-hp. boilers from the Wickes Boiler Co., 76 West Monroe Street, Chicago, and six pulverizers from the Erie City Iron Works, Erie, Pa. Figures on the generating unit are under consideration. G. C. Hockley is chief engineer.

The Central South

ST. LOUIS, May 28.

THE Atchison, Topeka & Santa Fe Railroad Co., 80 East Jackson Boulevard, Chicago, will soon take bids for a one-story machine shop at Guthrie, Okla., 50 x 200 ft. H. W. Wagner, Topeka, Kan., is division engineer.

A power house will be erected at the new three-story plant, 260 x 800 ft., to be built by the Ralston Purina Co., Eighth and Gratiot Streets, Kansas City, Mo., estimated to cost \$1,000,000.

The Eldorado Auto Salvage Co., Eldorado, Kan., has inquiries out for a lathe and drill press.

The Gustave J. Gruendler Mfg. Co., Inc., Sixth and Pine Streets, St. Louis, manufacturer of ice and refrigerating machinery, has acquired the plant of the Wayne Mfg. Co., Main Street, totaling about 55,000 sq. ft. of floor area, for a branch works. Additional equipment will be installed, and other buildings erected on adjoining land.

The Kansas Gas & Electric Co., Wichita, Kan., will make extensions in its power plants and system, including the installation of equipment. A portion of a bond issue of \$3,500,000, now being sold, will be used. F. G. Sykes is vice-president.

The Morris Oil Co., Camden, Ark., Harry Morris, president, has concluded arrangements with the local Chamber of Commerce for 20 acres for a new oil refinery, for which plans are being drawn. It will have a capacity of 3000 bbl. a day and is estimated to cost \$350,000.

The Duncan Machinery Co., P. O. Box 265, Knoxville, Tenn., has inquiries out for brick-making machinery and presses, with power equipment, for a daily capacity of 50,000 brick.

C. W. Hurtger, 113 Locust Street, Eldorado, Kan., is making inquiries for a lathe and drill press.

The Purity Extract & Tonic Co., Chattanooga, Tenn., desires to get in touch with manufacturers of machinery for making nails.

The Arkansas Light & Power Co., Pine Bluff, Ark., has commissioned Ford, Bacon & Davis, 115 Broadway, New York, engineers, to prepare plans for the construction of a hydroelectric power plant near Malvern, Ark., on the Ouachita River, estimated to cost \$1,500,000 with machinery. H. C. Couch is president.

The Hayes Equipment Co., 702 East Gilbert Street, Wichita, Kan., manufacturer of mill and mechanical equipment, has awarded a contract to Vandenberg & Son, South Lawrence Street, for a one-story and basement addition, 55 x 120 ft.

The Louisville & Nashville Railroad Co., Louisville, is planning the construction of a one-story machine shop at Etowah, Tenn., to cost about \$30,000. G. R. Smiley is chief engineer.

The C. J. Kerbel Co., Louisville, has leased a one-story

building on Campbell Street and will remodel the structure to manufacture ice and refrigerating machinery.

The McGregor Motor Co., 428 St. Louis Street, Springfield, Mo., will build a one-story and basement machine and repair works, 40 x 175 ft., at 800 East McDaniel Street. A lathe, power drill press and other tools will be installed. Earl Hawkins & Co., McDaniel Building, are architects.

R. I. Frost, Eureka, Kan., operating an automobile machine and service works, plans for the installation of a lathe, drill press, emery grinder, cylinder grinder and other equipment.

Manual training equipment will be installed in the two-story high school to be erected at Hamilton, Kan., estimated to cost \$90,000. S. S. Voigt, 504 Orpheum Building, Wichita, Kan. is architect.

Electrically-operated pumping machinery will be installed by the City Commission, Winfield, Kan., in connection with extensions and improvements in the municipal waterworks. Bonds for \$112,000 have been voted. John Welfelt is city manager.

A manual training department will be installed in the two-story and basement high school to be erected at Leavenworth, Kan., estimated to cost \$250,000, for which bids are being asked on a general contract until June 11. Charles A. Smith, Finance Building, Kansas City, Mo., is architect.

The Louisville Gas & Electric Co., Louisville, has authorized plans for a new power plant on site of 75 acres, estimated to cost \$2,500,000 with machinery. The work will be handled under the supervision of the Byllesby Engineering & Management Corporation, 208 South La Salle Street, Chicago. Donald McDonald is president.

Electrically-operated pumping machinery will be installed in connection with extensions in the municipal waterworks at McAlester, Okla., for which bonds for \$375,000 have just been voted.

A manual training department will be installed in the proposed three-story high school to be erected at Almena, Kan. estimated to cost \$100,000, for which plans are being drawn by Smith & English, Nelson Building, Hutchinson, Kan., architects.

The Camp Branch Coal Co., Johnson City, Tenn., is planning for the installation of additional equipment at its mining properties, including shaker screens, cutting and sorting machinery, and power equipment. S. R. Jennings is head.

Manual training equipment will be installed in the new three-story high school to be erected at Oklahoma City, Okla., estimated to cost \$400,000; also, in the two-story additions to be constructed at the Capitol Hill junior high school, and the Western junior high school, each estimated to cost \$100,000. Smith & Forsyth, Southwestern National Bank Building, are architects for the three structures.

Electrically-operated pumping machinery will be installed in connection with extensions and improvements in the municipal waterworks at Memphis, Tenn., for which bonds for \$1,500,000 have been voted.

The Peoples Supply Co., 111 West Locust Street, Eldorado, Kan., operating a machine shop, is planning for the installation of a lathe and other equipment.

Russell & Axon, 404 McDaniel Building, Springfield, Mo., consulting engineers, have plans in preparation for a new hydroelectric generating plant on the Sac River, near Stockton, Mo., for a company being organized by G. B. Seward, Stockton, and associates. It will cost in excess of \$100,000.

Cincinnati

CINCINNATI, May 28.

THOUGH buying has subsided to some extent in the machine tool trade, there seems to be no let-up in the number of inquiries and manufacturers generally believe that the month of June will show quite a rush of orders. May business is holding well up to that of April. The Chicago & North Western Railroad bought the engine lathes on the list recently issued, and other railroad buying is expected to develop this week. Chief among the inquiries is one from the Pere Marquette for 79 machines for its Grand Rapids, Mich., shops, bids on which close June 1. The Navy Department will take bids until June 12 on three heavy duty engine lathes. Some inquiries are also current for export, but these generally consist of only single tools. The Ford Motor Co. is buying from time to time, and the Williamson Heating Co., Cincinnati, is purchasing metal-working machinery for its new plant now nearing completion.

The Hill & Griffith Co., State Avenue, Cincinnati, manufacturer of foundry facings, whose two plants were recently destroyed by fire, has commenced the erection of a factory at 1262 State Avenue, and expects to be in operation about July 1. Considerable new equipment will be installed. John Hill is president.

It is understood that the Cincinnati plant of the American Blower Co. will shortly be placed in operation. It was purchased over two years ago, and has been remodeled. A new power plant has recently been installed.

The Cincinnati plant of the Standard Parts Co., known as the Hess Spring & Axle plant, was sold at auction May 25 to A. J. Meyer, Cincinnati realtor, for \$136,000. It is reported that a local manufacturer may occupy the buildings, but the name of the purchaser has not been disclosed.

The Prest-O-Lite Co., Columbus, Ohio, and the Linde Air Products Co., a subsidiary, has purchased property on the south side of Marion Road, Columbus, and will erect a plant for the manufacture of acetylene and oxygen gas.

The Ohio Metal & Mfg. Co., Dayton, Ohio, will erect a one-story steel warehouse on property recently leased on Monument Avenue. The capital stock of the company will be increased to \$200,000 to take care of the expansion. Frank E. McBride, 335 East Monument Avenue, is president.

The Stutz Motor Car Co. of America, Indianapolis, has purchased the plant formerly occupied by the Ott Grinder Co., which will be used for material storage purposes, the space now occupied for this purpose in the main building to be turned over to production work.

The Gulf States

BIRMINGHAM, May 28.

A POWER house will be constructed by the Fort Worth Elevator Co., Fort Worth, Tex., in connection with its proposed three-story grain elevator, 72 x 192 ft., estimated to cost \$500,000, with machinery. Jewell Smith is president.

The Fort Worth & Denver City Railroad Co., Fort Worth, Tex., will rebuild the portion of its car repair shops at Childress, Tex., destroyed by fire May 17, with loss approximating \$150,000 including equipment.

The Common Council, Louisville, Miss., is arranging a bond issue of \$30,000, for the installation of a municipal electric light and power plant.

The Alabama Power Co., Birmingham, is perfecting plans for enlargements in its hydroelectric power plant on the Warrior River, near Lock 17, estimated to cost \$500,000 with machinery.

The School Board, Sylacauga, Ala., will commence the erection of an addition to the local school, to be equipped as a manual training department.

The Standard Sanitary Mfg. Co., Bessemer Building, Pittsburgh, manufacturer of enameled iron products, has purchased property at Fifth Avenue, South, and Twenty-second Street, Birmingham, for a new branch plant, for which plans will be prepared at once.

The City Clerk, Lecompte, La., will receive bids until June 12 for a municipal light and power plant and equipment, including oil-operated engines, generating apparatus, air compressor, motors, etc. Swanson-McGraw, Inc., United Fruit Building, New Orleans, is consulting engineer.

Bids will be received by the Third Mississippi River District, P. O. Box 404, Vicksburg, Miss., until June 15, for 8 marine boilers and auxiliary equipment.

A manual training department will be installed in the high school to be erected at Floydada, Tex., estimated to cost \$90,000, for which plans will be prepared at once.

The Southern Folding Box Co., 442 North Seventh Street, Jacksonville, Fla., is taking bids until June 15, on a general contract, for a new plant. Bids will also be asked for machinery, including power and transmission equipment. W. A. Connacher is president.

W. H. Cauley, Elba, Ala., has plans for rebuilding his power house and saw mill destroyed by fire May 23. An official estimate of loss has not been announced.

H. W. Dexter, Bisbee Building, Jacksonville, Fla., machinery dealer, is making inquiries for a caterpillar crane, about 5 tons capacity, second-hand.

Manual training equipment will be installed in the proposed new school to be erected at Denton, Tex., for which a special election to vote bonds for \$200,000 will be held on June 19.

The Standard Handle Co., Macon, Ga., manufacturer of implement handles, will commence the construction of a branch plant at Greenwood, Miss., to cost \$50,000 with machinery.

The San Antonio & Rio Grande Valley Traction Co., San Antonio, Tex., has tentative plans for a hydroelectric

power house on the San Miguel River to cost in excess of \$300,000, for service for a proposed traction line.

The Florida Orchard & Packing Co., Thomasville, Ga., contemplates the erection of a power house in connection with a new fertilizer manufacturing plant near Blountstown, Fla., to cost \$100,000 with equipment. W. H. Baxley, Blountstown, is president and general manager.

A manual training department will be installed in the proposed high school to be erected by the Kimble County Board of Education, Junction, Tex., estimated to cost \$85,000.

The Houston, Beaumont & Orange Interurban Railway Co., Orange, Tex., recently organized with a capital of \$450,000, has tentative plans for a power house in connection with its proposed traction line from Houston to Orange, 100 miles. S. M. White and G. W. McFarlane, Orange, head the company.

The Florida Sugar & Food Products Co., Lake Worth, Fla., will make extensions and improvements in its mill at Canal Point, Fla., to cost about \$300,000, to include the installation of additional power and operating machinery. New cane handling equipment will be purchased, as well as a locomotive and cars for the private railroad. F. E. Bryant is president.

Electrically-operated pumping machinery will be installed at the municipal waterworks, Fort Worth, Tex., to increase the capacity from 16,000,000 to 28,000,000 gal. per day. It is estimated to cost \$80,000. J. S. Lord is water commissioner in charge.

The American Toy Co., Laurel, Miss., has leased a building on Windham Street, and will commence the installation of equipment for the manufacture of metal toys, sleds and kindred products.

The Albaugh-Wright Lumber Co., 941 Austin Street, San Antonio, Tex., recently organized, is planning the establishment of a local mill with electrically-operated machinery. Ellis Albaugh is president.

Canada

TORONTO, May 28.

INQUIRY for machine tools continues active and orders are improving. During the past week the Riverdale Branch of the Technical School, Toronto, placed orders for machinery, tools, and woodworking shop equipment. In addition to this list just closed bids are being received by W. H. Pearse, business administrator and secretary-treasurer of the Board of Education, 155 College Street, Toronto, for further equipment for the Riverdale school including, pony planer, grinder, shop benches, metalworking tools, woodworking tools, foundry tools, dust collector, wood trimmer, oil and soft metal furnaces, plain milling machine, cutter grinder, motor repair tools, etc.

Industrial concerns throughout the Dominion are also showing keen interest in shop equipment and orders involving tools in small units are numerous. Inquiry for equipment for elevators is good and those interested in the market look for a brisk demand for this class of machinery within the next month or two.

Faucher & Gullbert, Danville, Que., are interested in sawmill machinery for new mill.

J. Menard, Coteau du Lac, Que., is in the market for equipment for a door manufacturing plant.

E. J. Mayo & Co., 654 Chambord Street, Montreal, is asking for machinery for the manufacture of lathes. P. Merinier is manager.

The National Woodturning Co., St. Alexis des Monts, Que., is in the market for woodworking machinery and equipment. J. Chloine is the purchasing agent.

The Roxton Mill & Chair Mfg. Co., Waterloo, Que., is asking for woodworking machinery and equipment. J. H. Poirier is purchasing agent.

G. Rosseau, Robertsonville, Que., is asking for sawmill machinery and equipment.

Extensive additions are being made and new equipment installed in the plant of the United States Light & Heat Co., recently established at Niagara Falls, Ont.

Among the new grain elevators to be erected in Canada during the year are the following: The Montreal Harbor Commission, Montreal; James Stewart Grain Co., Port Arthur, Ont.; Doukhobors, Ludbreck, Alta.; Kamloops-Vancouver Co., Ltd., Kamloops, B. C., and the Saskatchewan Elevator Co., 25 new elevators throughout Western Canada.

The Dodds Machinery Co., Welland, Ont., proposes to remove its plant to Stratford, Ont. The company had

expected to receive certain concessions from the town of Welland, but owing to refusals on the part of the town officials, the company has decided to seek a new location for its plant.

The Quebec Pulp & Paper Co., Sillery, Que., recently incorporated, proposes to start work in the early future on the erection of a ground wood pulp mill there, and will make arrangements to extend the plant at a future date to include the production of sulphite pulp and newsprint paper. John D. Roche, Montreal, is interested.

The contract for the erection of power house in connection with 20,000 hp., development project at Des Quinze River, near Cobalt, Ont., has been awarded to Morrow & Beatty, Peterborough, Ont.

The city of Hamilton, Ont., S. H. Kent, city clerk, will receive bids until June 6 for a horizontal centrifugal sewage pump (capacity 130 gal. per min. at 67 ft. head), with 10-hp. motor and automatic starter.

Plans of New Companies

The Picturola Corporation, 383 Madison Avenue, New York, has been incorporated with capital stock of \$15,000,000, under Delaware laws, to manufacture motion picture machines and parts. The company now has a plant in Brooklyn, which will be equipped to do work mainly of an assembling character. Manufacturing at first will be done under contract and bids soon will be taken on jigs and dies. The company's larger machine, which is continuous and automatic, involves considerable gearing and is completely enclosed in sheet steel. These machines are for commercial use. P. S. Parish is president.

The Eastern Transmission Co., Philadelphia, has been organized as a consolidation of 18 power companies, controlled by Day & Zimmerman, engineers. The companies operating in several counties near Philadelphia, bear the following names: Granville, South Woodbury, Bratton, Fannett, Tod, Letterkenny, Springfield, Cromwell, Tuscarora, Milford, Clay, Dublin, Tell, Lack, Beale, Lurgan and Metal.

The Walters Mfg. Co., Fulton Building, Pittsburgh, was recently incorporated to manufacture brazed steel specialties, including iron paint, roof cement, roofing, torches and oil carriers. It has its own factory and is now on an operating basis. Charles W. Walters is president.

The Worcester Japaning & Enameling Co., Worcester, Mass., has been organized to do japaning and enameling. Negotiations have been made for present manufacturing.

The Standard Office Machine Co., care of Willard P. Smith, Call Building, San Francisco, has been incorporated to manufacture machines and appliances for office service, but purposes to confine present activities to acting as manufacturers' agent.

The Swedish Steel Co., care of O. Bergstrom, 836 Harrison Street, San Francisco, has been incorporated to manufacture steel and iron products. It is now acting merely as importer of iron and steel products, principally from Sweden.

Charles A. Carpenter and William L. Byrne, Pittsburgh, have formed a partnership, trading as Carpenter & Byrne, manufacturers' representatives, with offices in the House Building, Pittsburgh. They will serve as general industrial sales agents for the Robinson Ventilating Co., Pittsburgh, with a plant at Zelonople, Pa.; district representatives, the York Heating & Ventilating Corporation, Philadelphia; R. D. Wood & Co., Philadelphia, for gas products, hydraulic machinery and valves; Milwaukee Tank Works, Milwaukee, for industrial installations; and will do some specialized forging sales work for the Oliver Iron & Steel Corporation, Pittsburgh. Mr. Byrne is a graduate of Georgetown University, class of 1910, and has been active in the forging business in the Pittsburgh district for several years. Mr. Carpenter is a graduate of Cornell, class of 1908, and served in the ordnance department in the Pittsburgh district during the World War. He was for several years general foreman of the Camden, N. J., works, R. D. Wood & Co.

The Bullis Check Writer Corporation, 923 Harvard Street, Rochester, N. Y., has been incorporated with capital stock of \$75,000, and will manufacture check writing machines and parts. Its manufacturing will be done by contract. The company is now seeking bids for the work and would prefer to make arrangements with a Middle West manufacturer equipped for this kind of work. The incorporators are F. O. Bullis, M. J. Nugent and J. P. Grahame.

Elgin Motors, Inc., has been organized to purchase certain assets of the Elgin Motor Car Corporation and will continue the manufacture of Elgin cars. J. H. McDuffee is president and B. L. Lyman is vice-president.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:

| | |
|---------------------------------------|--------|
| Refined iron bars, base price..... | 3.54c. |
| Swedish bars, base price..... | 7.50c. |
| Soft steel bars, base price..... | 3.54c. |
| Hoops, base price..... | 5.19c. |
| Bands, base price..... | 4.39c. |
| Beams and channels, angles and tees | |
| 3 in. x ¼ in. and larger, base..... | 3.64c. |
| Channels, angles and tees under 3 in. | |
| x ¼ in., base..... | 3.54c. |

Merchant Steel

| | Per Lb. |
|--|------------------|
| Tire, 1½ x ½ in. and larger..... | 3.60c. |
| (Smooth finish, 1 to 2½ x ¼ in. and larger)..... | 3.80c. |
| Toe-calk, ½ x ¾ in. and larger..... | 4.60c. |
| Cold-rolled strip, soft and quarter hard..... | 7.50c. to 8.50c. |
| Open-hearth spring-steel..... | 5.00c. to 7.50c. |
| Shafting and Screw Stock: | |
| Rounds..... | 4.40c. to 4.65c. |
| Squares, flats and hex..... | 4.90c. to 5.15c. |
| Standard tool steel, base price..... | 15.00c. |
| Extra tool steel..... | 18.00c. |
| Special tool steel..... | 23.00c. |
| High speed steel, 18 per cent tungsten..... | 75c. to 80c. |

Tank Plates—Steel

| | |
|------------------------|--------|
| ¾ in. and heavier..... | 3.64c. |
|------------------------|--------|

Sheets

Blue Annealed

| | Per Lb. |
|-------------|---------|
| No. 10..... | 4.59c. |
| No. 12..... | 4.64c. |
| No. 14..... | 4.69c. |
| No. 16..... | 4.79c. |

Box Annealed—Black

| | Soft Steel C. R., One Pass Per Lb. | Blued Stove Pipe Sheet Per Lb. |
|---------------------|--|--------------------------------------|
| Nos. 18 to 20..... | 4.80c. to 5.05c. | |
| Nos. 22 and 24..... | 4.85c. to 5.10c. | 5.35c. |
| No. 26..... | 4.90c. to 5.15c. | 5.40c. |
| No. 28..... | 5.00c. to 5.25c. | 5.50c. |
| No. 30..... | 5.20c. to 5.45c. | |

No. 28 and lighter, 36 in. wide, 10c. higher

Galvanized

| | Per Lb. |
|---------------------|------------------|
| No. 14..... | 5.10c. to 5.35c. |
| No. 16..... | 5.25c. to 5.50c. |
| Nos. 18 and 20..... | 5.40c. to 5.65c. |
| Nos. 22 and 24..... | 5.55c. to 5.70c. |
| No. 26..... | 5.70c. to 5.95c. |
| No. 27..... | 5.85c. to 6.10c. |
| No. 28..... | 6.00c. to 6.25c. |
| No. 30..... | 6.50c. to 6.75c. |

No. 28 and lighter, 36 in. wide, 20c. higher

Welded Pipe

Standard Steel

| | Black | Galv. |
|----------------|-------|-------|
| ½ in. Butt.. | —41 | —24 |
| ¾ in. Butt.. | —46 | —32 |
| 1-3 in. Butt.. | —48 | —34 |
| 2½-6 in. Lap. | —44 | —30 |
| 7-8 in. Lap.. | —41 | —11 |
| 9-12 in. Lap. | —34 | —6 |

Wrought Iron

| | Black | Galv. |
|----------------|-------|-------|
| ½ in. Butt.. | —4 | +19 |
| ¾ in. Butt.. | —11 | +9 |
| 1-1½ in. Butt. | —14 | +6 |
| 2 in. Lap.... | —5 | +14 |
| 2½-6 in. Lap. | —9 | +9 |
| 7-12 in. Lap.. | —3 | +16 |

Steel Wire

| | Per Lb. |
|---------------------------|---------|
| Bright basic..... | 5.00c. |
| Annealed soft..... | 5.00c. |
| Galvanized annealed..... | 5.65c. |
| Coppered basic..... | 5.65c. |
| Tinned soft Bessemer..... | 6.65c. |

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

| | |
|----------------------------|----------------|
| High brass sheet..... | 20½c. to 21½c. |
| High brass wire..... | 21 c. to 22 c. |
| Brass rods..... | 18¾c. to 19¾c. |
| Brass tube, brazed..... | 28½c. to 29½c. |
| Brass tube, seamless..... | 25½c. to 26½c. |
| Copper tube, seamless..... | 27 c. to 28 c. |

Copper Sheets

Sheet copper, hot rolled, 24 oz., 24½c. to 25½c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

| | Grade "AAA" Charcoal 14x20 | Grade "A" Charcoal 14x20 | Coke—14 x 20 | Prime | Seconds |
|------------|-------------------------------------|-----------------------------------|--------------|--------|---------|
| Bright Tin | | | | | |
| IC.. | \$11.00 | \$9.75 | 80 lb.. | \$6.80 | \$6.55 |
| IX.. | 12.25 | 11.00 | 90 lb.. | 6.90 | 6.65 |
| IXX.. | 13.50 | 12.25 | 100 lb.. | 7.00 | 6.75 |
| IXXX.. | 14.75 | 13.50 | IC.. | 7.15 | 6.90 |
| IXXXX.. | 16.50 | 14.75 | IX.. | 8.15 | 7.90 |
| | | | IXX.. | 9.15 | 8.90 |
| | | | IXXX.. | 10.15 | 9.90 |
| | | | IXXXX.. | 11.15 | 10.90 |

Terne Plates

| | 8-lb. coating, 14 x 20 |
|----------------------|------------------------|
| 100 lb..... | \$7.00 to \$8.00 |
| IC..... | 7.25 to 8.25 |
| IX..... | 8.25 to 8.75 |
| Fire door stock..... | 9.00 to 10.00 |

Tin

| | |
|------------------|--------------|
| Straits pig..... | 46c. |
| Bar..... | 55c. to 60c. |

Copper

| | |
|-------------------|-------|
| Lake ingot..... | 17¾c. |
| Electrolytic..... | 17¾c. |
| Casting..... | 17 c. |

Spelter and Sheet Zinc

| | |
|------------------------------------|------------------|
| Western spelter..... | 8 c. |
| Sheet zinc, No. 9 base, casks..... | 10¼c. open 10¾c. |

Lead and Solder*

| | |
|---------------------------------|--------------|
| American pig lead..... | 8½c. to 9c. |
| Bar lead..... | 12c. to 13c. |
| Solder, ½ and ½ guaranteed..... | 33½c. |
| No. 1 solder..... | 31½c. |
| Refined solder..... | 28c. |

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

| | |
|-------------------------------|--------------|
| Best grade, per lb..... | 75c. to 90c. |
| Commercial grade, per lb..... | 35c. to 50c. |
| Grade D, per lb..... | 25c. to 35c. |

Antimony

| | |
|--------------|-------------|
| Asiatic..... | 8½c. to 9c. |
|--------------|-------------|

Aluminum

| | |
|--|--------------|
| No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.... | 32c. to 33c. |
|--|--------------|

Old Metals

The market is weak and business is at a standstill. Dealers' buying prices are nominally as follows:

| | Cents Per Lb. |
|--|------------------|
| Copper, heavy crucible..... | 12.75 |
| Copper, heavy wire..... | 12.00 |
| Copper, light and bottoms..... | 10.00 |
| Brass, heavy..... | 6.75 |
| Brass, light..... | 5.50 |
| Heavy machine composition..... | 9.50 |
| No. 1 yellow brass turnings..... | 6.75 |
| No. 1 red brass or composition turnings..... | 8.50 |
| Lead, heavy..... | 6.00 |
| Lead, tea..... | 4.50 |
| Zinc..... | 4.25 |

